

**PRELIMINARY REVIEW DRAFT: For Groundfish Plan Team Review**

**Environmental Assessment/ Regulatory Impact Review/ Initial  
Regulatory Flexibility Analysis for Proposed Amendments to the  
Fishery Management Plans for Groundfish of the Bering Sea and  
Aleutian Islands Management Area and Gulf of Alaska**

**Inclusion of Grenadiers (Family Macrouridae) In  
the Fishery Management Plans for Groundfish of  
the Bering Sea and Aleutian Islands and Gulf of  
Alaska**

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**Abstract:** This document is an Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis analyzing alternatives for the inclusion of three species of grenadiers (giant, Pacific, and popeye grenadiers) in the fishery management plans (FMPs) for groundfish of the Bering Sea and Aleutian Islands and the Gulf of Alaska. The purpose of this action is to improve the reporting and catch accounting of grenadiers in order to provide additional protection for grenadiers from the potential adverse effects of groundfish fisheries off Alaska. This action is necessary to amend the FMPs to include grenadiers, thereby allowing the adoption of management measures and catch accounting requirements. These management measures would be achieved by including grenadiers in the FMPs as either “in the fishery” or an “ecosystem component” and adopting management measures designed to improve the protection, conservation, and catch accounting of grenadiers.

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## Executive Summary

This document analyzes four alternatives for the inclusion of three species of grenadiers (giant, Pacific, and popeye grenadiers) in the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands (BSAI) Management Area and the Fishery Management Plan for Groundfish of the Gulf of Alaska (GOA). The purpose of this action is to improve the reporting and catch accounting of grenadiers in order to provide additional protection for grenadiers from the potential adverse effects of groundfish fisheries off Alaska. This action is necessary to amend the FMPs to include grenadiers, thereby allowing the adoption of management measures and catch accounting requirements. These management measures would be achieved by including grenadiers in the fishery management plans (FMPs) as either “in the fishery” or an “ecosystem component” and adopting management measures designed to improve the protection, conservation, and catch accounting of grenadiers.

### Council Problem Statement

The Council formulated the following problem statement in June 2012 to initiate this analysis.

*Grenadiers are not included in the BSAI or GOA groundfish FMPs. There are no limits on their catch or retention, no reporting requirements, and no official record of their catch. However, grenadiers are taken in relatively large amounts as bycatch, especially in longline fisheries; no other Alaskan groundfish has such high catches that is not included in the FMPs. Considerable information on giant grenadier exists that can be used for stock assessment (under Tier 5). Inclusion in the groundfish FMPs would provide for their precautionary management by, at a minimum, recording their harvest and/or placing limits on their harvest.*

### Alternatives

The alternatives and options evaluated in this analysis were adopted by the Council in June 2012.

Alternative 1: No action (Status Quo)

Alternative 2: Include Grenadiers in the BSAI and GOA FMPs as “in the fishery”

Alternative 3: Include Grenadiers in the BSAI and GOA FMPs as an “ecosystem component”

Alternative 4: Include Grenadiers in the BSAI FMP as an “ecosystem component” and in the GOA FMP as “in the fishery”

The species to be included (applicable to any action alternative):

Option 1. giant grenadier only

Option 2. giant, popeye, and Pacific grenadiers

### Regulatory Impact Review and Initial Regulatory Flexibility Analysis

The impacts on the socio-economic environment are analyzed in the Regulatory Impact Review (Section 5) and the Initial Regulatory Flexibility Analysis (Section 6)

Net benefits to the Nation will not increase, in the short run, under Alternative 2 relative to the status quo. This is because of the need to reduce total allowable catch (TAC) of some species in the BSAI in order to

add grenadier TAC to the annual specifications, which may decrease revenue unless a market for grenadier can be established. However, as a result of protecting the biomass, establishing grenadier TAC in the BSAI and GOA may lead to greater gross revenues from a sustainable fishery in the longer term. While grenadier has not proven to be easily marketable to date, there have been efforts to develop a market for this species. If a viable market should develop having grenadier “in the fishery” and managed for sustainability may enhance the long term total revenue of the BSAI and GOA groundfish fisheries. This is especially true given the large biomass of grenadier, and the fact that TAC levels of other species can vary considerably from year to year thereby affecting fishery total revenue.

Net benefits are not expected to decrease under Alternatives 3 and 4, relative to Alternatives 1 and 2. Alternatives 3 and 4 would not affect fishery revenue, as there would be no effect on TAC in the BSAI, and there is no TAC cumulative limit presently in the GOA. These alternatives would provide enhancements to species monitoring and management that, while not quantifiable, are considered to be beneficial.

The analysis of potentially directly regulated small entities is contained in Section 6. In the GOA, there were a total of 688 small catcher vessels and 5 small catcher/processors, for a combined total of 693 small GOA entities in 2012. The majority of these (561) are Catcher Vessels in the hook-and-line (HAL) gear type. In the BSAI, there were 76 small catcher vessels and 5 small catcher/processors, for a total of 81 small BSAI entities in 2012. The combined total for all of Alaska is 725 small catcher vessels and 10 small catcher/processors, or 735 small Alaska groundfish vessels in total in 2012.

## **Environmental Assessment**

The alternatives were analyzed for their impacts on grenadiers and groundfish target species, ecosystem components, marine mammals, seabirds, essential fish habitat, and for their socio-economic impacts.

The impacts of Alternative 1, the no action alternative, are not considered to be significantly beneficial or adverse at present. These findings in large part are because there is no directed fishing for grenadiers and the incidental catch of grenadiers is below allowable biological catch (ABC) levels. Alternative 1 would impede efforts to improve the protection, conservation, and catch accounting of grenadiers.

The impacts of Alternative 2, to include grenadiers in the FMPs as “in the fishery” as a target species, are not considered to be significantly beneficial or adverse at present. These findings in large part are because there is no directed fishing for grenadiers and the incidental catch of grenadiers is below ABC levels. Alternative 2 would improve the management, protection, conservation, and catch accounting of grenadiers.

The impacts of Alternative 3, to include grenadiers in the FMPs as “ecosystem component” species, are not considered to be significantly beneficial or adverse at present. These findings in large part are because there is no directed fishing for grenadiers and the incidental catch of grenadiers is below ABC levels. Alternative 3 would improve the catch accounting of grenadiers. Additional management measures could be adopted to improve the protection and conservation of grenadiers.

The impacts of Alternative 4, to include grenadiers in the FMPs as “ecosystem component” species in the BSAI and as “in the fishery” in the GOA, are not considered to be significantly beneficial or adverse at present. These findings in large part are because there is no directed fishing for grenadiers and the incidental catch of grenadiers is below ABC levels. Alternative 4 would have identical effects as Alternative 3 for grenadiers in the BSAI. Alternative 4 would have identical effects as Alternative 2 for grenadiers in the GOA.

The impacts of Option 1 or 2 under Alternatives 2, 3, or 4 would be identical. These options would select the grenadier species to be included in the FMPs and are not considered to be significantly beneficial or adverse.

The cumulative impacts of all the alternatives are not considered significantly beneficial or adverse in large part because there is no directed fishing for grenadiers and the incidental catch of grenadiers is below ABC levels. The cumulative impacts would need to be reexamined if a directed fishery for grenadiers were to develop.

## **Management and Enforcement Considerations**

This section outlines management measures that need to be adopted for grenadiers when considered for inclusion as “in the fishery” or as an “ecosystem component,” as well as additional management measures that could be, but need not be, adopted. The NMFS Office of Law Enforcement has no additional concerns with the enforcement of the provisions considered under any of the alternatives.

## **Organization of the Document**

This document is an Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA). The EA/RIR/IRFA provides assessments of the environmental impacts of an action and its reasonable alternatives (the EA), the economic benefits and costs of the action alternatives, as well as their distribution (the RIR), and the impacts of the action on directly regulated small entities (the IRFA). The purpose and need for the proposed action and the problem statement adopted by the Council are presented in Section 1, along with the history of the action. A description of the alternatives and options considered are presented in Section 2. Background information on grenadier biology, stocks, and catch history are presented in Sections 3.1, 3.2, and 3.3, respectively. The environmental impacts of the proposed action alternatives and options are presented in Sections 3.4 through 3.12. Management and enforcement considerations are addressed in Section 4. The Regulatory Impact Review (Section 5) discusses the socioeconomic impacts of the action, and the Initial Regulatory Flexibility Analysis (Section 6) evaluates the impact of the action on small entities. Section 8 reviews the proposed action with respect to the BSAI and GOA groundfish FMPs, the Magnuson-Stevens Act, and National Environmental Policy Act requirements. Section 9 lists the preparers and agencies and persons consulted, and Section 10 provides references for the literature cited.

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## List of Acronyms and Abbreviations

'	feet
ABC	acceptable biological catch
ACL	annual catch limit
ADF&G	Alaska Department of Fish and Game
AFSC	Alaska Fisheries Science Center
AIC	allowable incidental catch
AM	accountability measure
B	biomass
BSAI	Bering Sea and Aleutian Islands
BSAI groundfish FMP	Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area
CDQ	community development quota
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Council	North Pacific Fishery Management Council
E.O.	Executive Order
EA	environmental assessment
EC	ecosystem component
EEZ	exclusive economic zone
EFH	essential fish habitat
EIS	environmental impact statement
ESA	Endangered Species Act
F	Fishing mortality rate
FMP	fishery management plan
FONSI	Finding of No Significant Impact
FR	<i>Federal Register</i>
GOA	Gulf of Alaska
GOA groundfish FMP	Fishery Management Plan for Groundfish of the Gulf of Alaska
Hook-and-line	Regulatory abbreviation for common gear term longline. <sup>1</sup>
HAL	hook-and-line
IFQ	Individual fishing quota
IRFA	Initial regulatory flexibility analysis
m	meter or meters
M	natural mortality rate
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MRA	maximum retainable amount
MSRA	reauthorized Magnuson-Stevens Act of 2006
MSST	minimum stock size threshold
mt	metric ton

NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fishery Service
NOAA	National Oceanographic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
NS	National Standard
Observer Program	North Pacific Groundfish Observer Program
OFL	Overfishing Level <sup>2</sup>
OY	optimum yield
PAFL	pre-anal fin length
POT	pot gear
PBR	potential biological removal
PRR	product recovery rates
PSC	prohibited species catch
PSEIS	programmatic supplemental environmental impact statement
REEM	NMFS Resource Ecology and Ecosystem Modeling
REFM	NMFS Resource Ecology and Fisheries Management Division
RFA	Regulatory Flexibility Act
RFFA	reasonably foreseeable future action
RIR	regulatory impact review
SAFE	Stock Assessment and Fishery Evaluation
SBA	Small Business Act
SDC	significance determination criteria
SSC	Scientific and Statistical Committee
TAC	total allowable catch
URL	Uniform Resource Locator
U.S.	United States
U.S. DOC	United States Department of Commerce
USFWS	United States Fish and Wildlife Service
VMS	vessel monitoring system

<sup>1</sup> NMFS regulations use hook-and-line to define longline gear using hooks, as longline gear is also used with pots. Hook-and-line is used throughout this document except where "longline" is from a quote or an external source, title, or proper name.

<sup>2</sup> The BSAI Groundfish FMP defines OFL as overfishing level, while the GOA Groundfish FMP defines it as overfishing limit. Overfishing level is the term used in this document, as it is consistent with the MSRA definition of overfishing.

# 1 Introduction

This document analyzes four alternatives for the inclusion of several species of grenadiers (giant, Pacific, and popeye grenadiers) in the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI groundfish FMP) and the Fishery Management Plan for Groundfish of the Gulf of Alaska (GOA groundfish FMP). The alternatives under consideration include the addition of these species of grenadier either in the ecosystem component or “in the fishery” in the BSAI and/or GOA.

This document is an Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA). An EA/RIR/IRFA provides assessments of the environmental impacts of an action and its reasonable alternatives (the EA), the economic benefits and costs of the action alternatives, as well as their distribution (the RIR), and the impacts of the action on directly regulated small entities (the IRFA). This EA/RIR/IRFA addresses the statutory requirements of the Magnuson Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the National Environmental Policy Act, Presidential Executive Order 12866, and the Regulatory Flexibility Act. An EA/RIR/IRFA is a standard document produced by the North Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) Alaska Region to provide the analytical background for decision-making.

## 1.1 Purpose and Need

The purpose of this action is to provide additional protection for grenadiers in the BSAI and GOA from the potential adverse effects of groundfish fisheries and to improve the reporting and catch accounting of grenadiers. This action is necessary for the inclusion of grenadiers in the FMPs for groundfish in the BSAI and GOA, for the adoption of management measures to protect grenadiers from the potential adverse effects of groundfish fisheries, and to improve the reporting and catch accounting of grenadiers. This would be achieved by including grenadiers in FMPs as either “in the fishery” or as an “ecosystem component” and adopting management measures designed to improve the protection, conservation, and catch and disposition accounting of grenadiers. There are also two options that would specify the grenadier species to be included under any of the action alternatives.

### 1.1.1 Council Problem Statement

The Council formulated the following problem statement in June 2012, to initiate this analysis.

*Grenadiers are not included in the BSAI or GOA groundfish FMPs. There are no limits on their catch or retention, no reporting requirements, and no official record of their catch. However, grenadiers are taken in relatively large amounts as bycatch, especially in longline fisheries; no other Alaskan groundfish has such high catches that is not included in the FMPs. Considerable information on giant grenadier exists that can be used for stock assessment (under Tier 5). Inclusion in the groundfish FMPs would provide for their precautionary management by, at a minimum, recording their harvest and/or placing limits on their harvest.*

Although grenadiers have not been in the FMPs since 1980, there is no longer a valid scientific reason to exclude them. Bottom trawl surveys have shown giant grenadier is the most abundant species at depths 200 to 1,000 m on the continental slope of the GOA, eastern Bering Sea, and Aleutian Islands. Hence, it is of great ecological importance in this habitat. Based on this ecological importance alone, giant grenadier should be included in the FMPs. This is especially true given the current emphasis on ecosystem management by NMFS and the recommendations in the Magnuson-Stevens Act to implement ecosystem management. Moreover, giant grenadier is taken in relatively large amounts as bycatch,

especially in hook-and-line fisheries for sablefish and Greenland turbot. The giant grenadier are nearly all (more than 99 percent) discarded, and discard mortality is 100 percent because none of the fish survive when brought to the surface. If giant grenadier were included in the FMPs, reporting of catches would be mandatory and this would result in more accurate catch estimates than the present estimates that are based exclusively on observer data. Inclusion in the FMPs would also serve to address the problem of giant grenadier bycatch and discard waste in a formalized manner. Grenadiers in Alaska are unique in that this is the only non-FMP species group for which a stock assessment, using Tier 5 calculations, has been prepared. The stock assessment uses giant grenadier as a proxy for the species group.

Based on these reasons, grenadier stock assessment authors, the Council's BSAI and GOA Groundfish Plan Teams, and the Council's Scientific and Statistical Committee (SSC) have all recommended in recent years that grenadiers should be included in the FMPs, where they would be subject to management purview.

## 1.2 History of this Action

Prior to the implementation of Amendment 8 to the GOA groundfish FMP on November 1, 1980, grenadiers were included in the FMP. Amendment 8 established four species categories: unallocated, target, other, and non-specified. Amendment 8 placed grenadiers in the non-specified category. Non-specified species were defined as a residual category of species and species groups of no current or foreseeable economic value or ecological importance, which are taken in the groundfish fishery as incidental catch and are in no apparent danger of depletion and for which virtually no data exists that would allow population assessments. As non-specified species, no stock assessments are required and overfishing levels (OFLs), ABCs, and TACs are not established as part of the annual harvest specifications in either the BSAI or GOA. There are no limits on their catch or retention, no reporting requirements, and no official record of their catch and disposition.

The Council formed its Non-Target Species Committee in 2003 initially tasking it to 1) identify efficient methods for monitoring non-target catch, 2) improve abundance estimates of non-target catch, and 3) develop harvest recommendations that build sustainable populations of non-target species. At that time, grenadiers were listed in the BSAI and GOA as non-specified species. The Committee initially focused its attention on the species in the "other species" category (consisting of sharks, skates, sculpins, and octopus in the BSAI and sharks, squids, sculpins, and octopus in the GOA) and Tier 6 species. The Council initiated action in June 2008 to move grenadiers from the non-specified category to the target category based on recommendations from the Groundfish Plan Teams, SSC, and Non-Target Species Committee. Due to time constraints in implementing provisions of the reauthorized Magnuson-Stevens Act of 2006 (MSRA) and the revision of National Standard 1(NS1) in 2009, in 2011 it was decided to defer action on grenadiers.

The MSRA strengthened provisions to prevent and end overfishing and rebuild depleted fisheries. NMFS proposed revisions to NS1 guidelines at 50 CFR 600.310, to integrate these new requirements intended to reduce overfishing with existing provisions related to overfishing, rebuilding overfished stocks, and achieving optimum yield. On January 16, 2009, NMFS issued final guidelines for NS1 (74 FR 3178).

The Magnuson-Stevens Act, as amended by the MSRA, requires that each regional fishery management council develop annual catch limits (ACLs) and accountability measures (AMs) for each of its managed fisheries designated as being in the fishery such that each FMP under its jurisdiction has a mechanism for specifying ACLs at a level that overfishing does not occur in the fishery. In order to comply with the provisions of the MSRA, NMFS issued a final rule to implement Amendments 95 and 96 to the BSAI groundfish FMP and Amendment 87 to the GOA groundfish FMP (75 FR 61639, October 6, 2010.). These amendments revised the FMPs to meet NS1 guidelines for ACLs and AMs and removed the "other

species” and the “non-specified species” categories from the FMPs. The major taxonomic groups with similar life histories from the “other species” category (sharks, skates, octopus, and sculpins in the BSAI and sharks, squid, octopus, and sculpins in the GOA) were moved as species groups to the “in the fishery” category. The amendments originally included alternatives that would have moved grenadiers to either “in the fishery” or “ecosystem component” categories, but these alternatives were not carried forward when the final amendments were approved due to time constraints. Prohibited species (which include salmon, steelhead trout, crab, halibut, and herring) and forage fish (as defined in Table 2c to part 679 and section 679.20(i)) in both the BSAI and GOA were designated as “ecosystem components” in the FMPs. Existing management measures to conserve these stocks (such as no retention of prohibited species and the maximum retainable amount of 2 percent for forage fish) were retained for these stocks as “ecosystem components.”

## 2 Description of Alternatives

The alternatives and options evaluated in this analysis were adopted by the Council in June 2012. The management and enforcement actions needed to implement each of the alternatives are discussed in Section 4. The action alternatives considered would include grenadiers in the FMPs either as “in the fishery” as a target species group, or as “ecosystem component” species.

### 2.1 Alternative 1

#### *No action (Status Quo)*

This alternative would require no additional management measures. At present grenadiers are not included in the FMPs. There are no closed seasons (when directed fishing is prohibited), catch limits, or retention limits for grenadiers, and unlimited amounts may be taken. There are no reporting or recordkeeping requirements for grenadiers, and currently the best estimate of catch comes from observer data. Vessels which have a Federal Fisheries Permit may use their retention of grenadiers as basis species for the retention of other groundfish up to the maximum retainable amounts listed in Tables 10 and 11 to part 679, for the GOA and BSAI. Alternative 1 does not comport with the problem statement adopted by the Council in June 2012. In recent years, the stock assessment authors with the Alaska Fisheries Science Center’s (AFSC) Auke Bay Laboratory, together with the BSAI and GOA Groundfish Plan Teams, and the SSC have all recommended that grenadiers should be included in the FMPs, where they would be subject to management purview. Therefore, given the substance of these recommendations, continued exclusion of grenadiers from the FMPs does not appear to be a reasonable option.

### 2.2 Alternative 2

*Include grenadiers in the BSAI and GOA FMPs as “in the fishery.”* This alternative would include grenadiers “in the fisheries” as targeted species.

The term “in the fishery” is defined in the final rule to amend National Standard 1 guidelines (74 FR 3178, January 16, 2009). Stocks of fish that are “in the fishery” are those stocks that are targeted, and retained for sale or personal use; stocks that are not directly targeted but are taken incidentally in other directed fisheries and are retained for sale or personal use; and stocks not targeted or retained but are taken as incidental catch and for which overfishing or overfished status may be a concern. For each of those stocks, whether a single species or species group, ACLs, AMs, OFLs, ABCs, and TACs must be established each year in the annual harvest specifications process. In order for separate species to be aggregated together and managed as a species group, the species should have a similar geographic distribution, life history, and vulnerability. The species groups may be managed as an indicator stock or stocks with separate significance determination criteria (SDC) consisting of a maximum fishing mortality threshold, minimum stock size threshold (MSST), and ACL; managed with a single SDC and ACL for the entire species group; or as indicator stock or stocks with separate SDCs with a single ACL for the species group (provided that the indicator stock or stocks are representative of the species group as described above). Recordkeeping and reporting of grenadier catch would be required and other management measures discussed in Section 4 would need to be adopted. Grenadiers meet the criteria outlined above for inclusion in the FMPs, and the criteria addresses the problem statement adopted by the Council in June 2012. Alternative 2 has been recommended by the stock assessment authors, the AFSC, Auke Bay Laboratory, and the BSAI and GOA Groundfish Plan Teams.

## 2.3 Alternative 3

*Include grenadiers in the BSAI and GOA FMPs as an “ecosystem component.”*

The term “ecosystem component” is defined in the final rule to amend National Standard 1 guidelines (74 FR 3178, January 16, 2009). In order to be designated as an “ecosystem component” (EC) the species or species group should be a non-targeted species or species group; not subject to overfishing, overfished, or approaching an overfished condition based on the best available information in the absence of conservation and management measures; and not generally retained (a small amount could be retained) for sale or commercial use. The catch of EC species is required to be reported for monitoring purposes and directed fishing (open status) for EC species is prohibited. However, maximum retainable amounts of incidental catch and other management measures can be adopted for EC species. Species may be included in the FMPs as an EC for any of the following reasons: for data collection and catch monitoring purposes; for ecosystem considerations related to specification of optimum yield (OY) for the associated fishery; as considerations in the development of conservation and management measures for the associated fishery; or to address other ecosystem concerns. While EC species are not considered to be “in the fishery,” the Council should consider measures for the fishery to minimize incidental catch and mortality of EC species consistent with National Standard 9, and to protect their role in the ecosystem. EC species do not require specification of reference points but should be monitored as new, pertinent scientific information becomes available to determine changes in their status or their vulnerability to the fishery. Should it become necessary, they should be reclassified as “in the fishery.”

Moving a species from the EC to “in the fishery” may need to be investigated under various situations including when the industry expresses an interest in targeting the EC species, when retention of the EC increases, when an adequate assessment of the EC is approved by the SSC, or when there is evidence that discards required by regulation are occurring.

## 2.4 Alternative 4

*Include grenadiers in the BSAI FMP as an “ecosystem component” and in the GOA FMP as “in the fishery.”*

This alternative is offered as a “compromise” between the alternatives outlined above. There are good scientific and rational arguments for categorizing grenadiers as “in the fishery” in both the GOA and the BSAI. However, classifying grenadiers as “in the fishery” in the BSAI may impact the manner in which the cumulative TACs of each target species or species groups are set so as not to exceed the overall OY cap of 2.0 million mt in the BSAI. Presumably the TAC for grenadiers would be set at an amount not to exceed the ABC and minimally at an amount necessary to meet incidental catch needs in other directed groundfish fisheries. The TACs for other, more valuable groundfish targets would have to be slightly lowered in those years when the maximum OY cap of 2.0 million mt can be taken. A possible solution to this problem would be to categorize grenadiers as “in the fishery” in the GOA and as “ecosystem component” species in the BSAI. Placing grenadiers in the “ecosystem component” category in the BSAI would mean that their catches would not count toward the OY cap of 2.0 million mt and would not affect the TACs of other groundfish in this area. Categorizing grenadiers as an “ecosystem component” in the BSAI may be acceptable from a biological and management standpoint because giant grenadiers are very abundant in this area, whereas catches have been relatively small. Thus, overfishing of grenadiers in the BSAI is unlikely in the foreseeable future. In contrast, there is more of a need to categorize grenadiers in the GOA as “in the fishery” because giant grenadier in this area are not as abundant, relative to the larger size of the GOA, and their catches have been consistently larger than in the BSAI. Categorizing grenadiers in the GOA as “in the fishery” would help ensure that overfishing of giant grenadier in this

area would not occur.

## 2.5 Options

The options for grenadier species to be included (applicable to any action alternative) are:

**Option 1.**      *giant grenadier only*

Giant grenadier are by far the most common grenadier caught in the fisheries and surveys off Alaska and are used as a proxy for the entire grenadier complex in the grenadier assessment. The stock assessments are based on Tier 5 calculations where  $OFL = B$  (biomass)  $\times M$  (natural mortality rate) and  $ABC = OFL \times 0.75$ .

**Option 2.**      *giant, popeye, and Pacific grenadiers*

Popeye and Pacific grenadiers do not commonly occur in the surveys and are seldom caught in the commercial fisheries because they inhabit depths greater than where the commercial fisheries occur and at depths infrequently sampled by the surveys. The OFL and ABC would continue to be based on B and M estimates for giant grenadiers only as a proxy for the grenadier complex. The immediate advantage of this option would be to improve the catch and disposition estimates and reporting of popeye and Pacific grenadier.

### 3 Environmental Assessment

In this section, the impacts of the alternatives and options on the various environmental components are evaluated. Information with which to understand the affected environment for each resource component is summarized in the relevant subsection. For each resource component, criteria are identified to evaluate the significance of impacts. If significant impacts are likely to occur, preparation of an environmental impact statement (EIS) is required. Although an EIS should evaluate economic and socioeconomic impacts that are interrelated with natural and physical environmental effects, economic and social impacts by themselves are not sufficient to require the preparation of an EIS (see 40 CFR 1508.14).

Analysis of the potential cumulative effects of a proposed action and its alternatives is a requirement of the National Environmental Protection Act (NEPA). An environmental assessment or environmental impact statement must consider cumulative effects when determining whether an action significantly affects environmental quality. The Council on Environmental Quality (CEQ) regulations for implementing NEPA define cumulative effects as:

*“the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).*

The discussion of past and present cumulative effects is addressed with the analysis of direct and indirect impacts for each resource component below. The cumulative impact of reasonably foreseeable future actions is addressed in Section 3.11. Section 4 addresses the management and enforcement considerations of the proposed alternatives and options.

#### The Action Area Affected

The action area includes the entire BSAI and GOA management areas. The documents listed below contain extensive information about the fishery management areas, fisheries, marine resources, ecosystem, social, and economic elements of the BSAI and GOA groundfish fisheries. Rather than duplicate an affected environment description here, readers are referred to these documents. This list is a partial listing of NEPA documents that have been prepared for BSAI and GOA fishery management measures. Internet links to these documents, as well as a comprehensive list of NEPA documents that have been prepared by NMFS Alaska Region and the Council are at <http://www.alaskafisheries.noaa.gov/cm/analyses/default.aspx>.

***Alaska Groundfish Harvest Specifications Final Environmental Impact Statement (NMFS 2007).*** This EIS provides decision makers and the public with an evaluation of the environmental, social, and economic effects of alternative harvest strategies for the federally managed groundfish fisheries in the GOA and BSAI management areas. The EIS examines alternative harvest strategies that comply with Federal regulations, the BSAI groundfish FMP, and the Magnuson-Stevens Act. These strategies are applied to the best available scientific information to derive the TAC estimates for the groundfish fisheries.

***Stock Assessment and Fishery Evaluation (SAFE) Reports for the Groundfish Resources of the Bering Sea and Aleutian Islands and Gulf of Alaska (NPFMC 2010a and b, 2011a and b, 2012a and b).*** Annual SAFE reports contain a review of the latest scientific analyses and estimates of each BSAI and GOA species species' biomass and other biological parameters. This includes the acceptable biological

catch specifications used by NMFS in the annual harvest specifications. The SAFE reports also include summaries of the available information on the BSAI and GOA ecosystem and the economic condition of the groundfish fisheries off Alaska. These documents are available from <http://www.afsc.noaa.gov/refm/stocks/assessments.htm>.

***Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement (Final PSEIS; NMFS 2004)***. This Final PSEIS was prepared to evaluate the fishery management policies embedded in the BSAI and GOA groundfish FMPs against policy-level alternatives. NMFS issued a Record of Decision for the Final PSEIS on August 26, 2004, effectively implementing a new management policy that is ecosystem-based and more precautionary when faced with scientific uncertainty. The Final PSEIS serves as the primary environmental document for subsequent analyses of environmental impacts on the groundfish fisheries. Chapter 3 of the Final PSEIS provides a detailed description of the affected environment, including extensive information on fishery management areas, marine resources, and marine habitat in the North Pacific Ocean. For more information, see the Final PSEIS and related documents at <http://www.alaskafisheries.noaa.gov/sustainablefisheries/seis/default.htm>.

### 3.1 Grenadier Biology and Life History

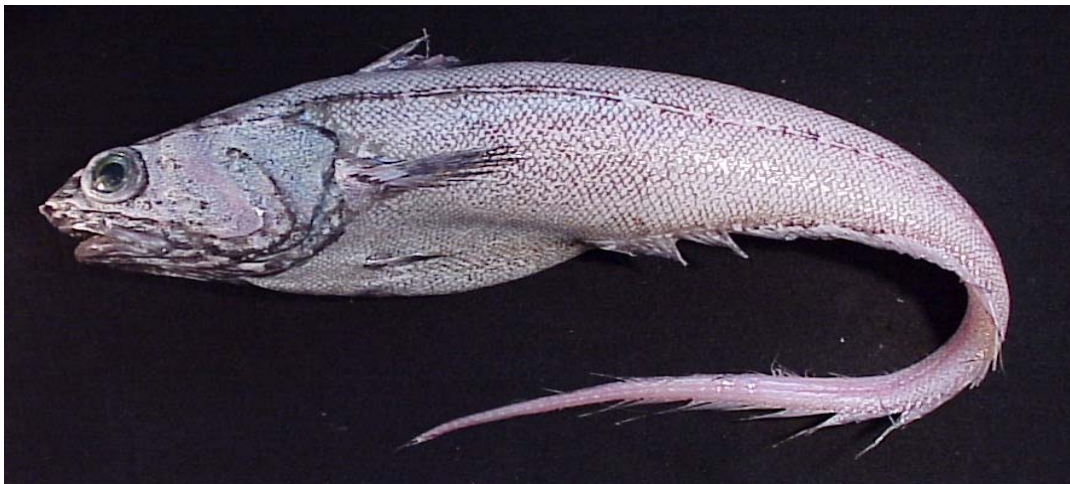


Figure 3-1 Giant grenadier

## Giant Grenadier

**Distribution, abundance, and ecology:** Giant grenadier range from Baja California, Mexico, around the arc of the north Pacific Ocean to Japan, including the Bering Sea and the Sea of Okhotsk (Mecklenburg et al. 2002), and are also found on seamounts in the Gulf of Alaska and on the Emperor Seamount chain in the North Pacific (Clausen 2008). Giant grenadier have the shallowest depth distribution of all grenadiers caught in Alaska, the largest apparent biomass, and the largest body size (see Figure 3-1) of all world grenadiers. They are the most abundant overall species on the continental slope in the eastern Bering Sea and the GOA from 200 to 1,000 m (von Szalay et al. 2008; Hoff and Britt 2011). In Alaska, they are especially abundant on the continental slope in waters greater than 400 m depth. Bottom trawl and hook-and-line surveys and fishery samples indicate that females and males have different depth distributions, with females comprising the great majority of the catch at depths less than 800 m.

Small, juvenile and larval fish less than approximately 15 to 20 cm pre-anal fin length (PAFL) are absent from bottom trawl catches, so juveniles may be pelagic in their distribution. Since they are not caught, there is no information on their early life history. PAFL is defined as the distance between the tip of the snout and the insertion of the first anal fin ray since grenadiers have long, fragile tails that are frequently broken off when caught. Measurements of bomb radiocarbon were used in an attempt to validate aging techniques, but there was no evidence of radiocarbon in otoliths, indicating that grenadier spend little or no time near the surface, even as larvae or juveniles.

Adults are often found in close association with the bottom, as evidenced by their large catches in bottom trawls and bottom hook-and-line gear. However, studies on the food habits of giant grenadier have found that they feed primarily on species found in the water column (Drazen et al. 2001; Yang 2003; Yang et al. 2006). Sablefish hook-and-line fishermen report that their highest catches of giant grenadier often occur when the line has been inadvertently “clothes-lined” between two pinnacles, rather than set directly on the bottom. If giant grenadier do move off-bottom, some of the population may be unavailable to the bottom trawl, so biomass may be even greater than estimates from trawl surveys.

**Predators:** Pacific sleeper sharks (*Somniosus pacificus*) and Baird’s beaked whales (*Berardius bairdii*) are predators of giant grenadier (Orlov and Moiseev 1999; Walker et al. 2002). Sperm whales (*Physeter macrocephalus*) are also likely predators of giant grenadier since there is evidence of them depredating on hook-and-line catches of grenadier on the Alaska Fisheries Science Center’s (AFSC’s) annual Alaska Longline Survey.

**Maturity and age:** Grenadiers are long-lived and late to mature. In a recent age-at-maturity study of females, the oldest fish was 58 years and the age and length at which 50 percent of the females were mature was 23 years and 26 cm PAFL, much older than most other groundfish (Rodgveller et al. 2010). Length frequency distributions for giant grenadier in the commercial fishery and size composition data for the AFSC Longline Surveys show that only fish greater than 20 cm PAFL are taken by hook-and-line gear and pots, and relatively few fish less than 25 cm PAFL are caught; therefore, mature fish likely comprise the majority of the giant grenadier catch (see Figure 3-8 for an example of the relative size of giant grenadier Figure 3-1).

Spent, resting, maturing, and immature fish were all found during the summer months in the Gulf of Alaska. Thus, the spawning period is thought to be protracted and may even extend throughout the year (Rodgveller et al. 2010).

**Speciation:** In a recent study of age-at-maturity of giant grenadier (Rodgveller et al. 2010) different otolith shapes were observed among fish. There are no other known cases of otolith shape varying to this

degree within a species. In 2013, tissue and otolith samples will be collected on the AFSC Longline Survey for an analysis of speciation, stock structure, and otoliths morphometrics. Fish will be sampled from the Bering Sea, western GOA, and the eastern GOA.

### **Popeye and Pacific Grenadier**



**Figure 3-2 Giant (top) and Pacific (bottom) grenadier**





## 3.2 Stock Assessment for Grenadiers

### 3.2.1 Tier 5 Calculations

Full assessment reports were prepared in even years starting in 2006 (Clausen 2006; Clausen and Rodgveller 2008; 2010; Clausen and Rodgveller 2011, Rodgveller and Clausen 2012). Because grenadiers are non-FMP species, these reports are considered unofficial and have been included as appendices in the standard Stock Assessment and Fishery Evaluation (SAFE) reports.

At present, stock assessment information for giant grenadier is relatively good compared to many other non-target species off Alaska. Since 2010, ABC and OFL recommendations have been based on Tier 5 computations, since reliable estimates of biomass are available as well as an estimate of natural mortality ( $M$ ). These computations have been based on giant grenadier only and have excluded the other grenadier species because virtually none of the other species are caught in the commercial fishery and relatively few are taken in fish surveys. Therefore, in the Tier 5 determinations, giant grenadiers have served as a proxy for the entire grenadier group. To estimate acceptable biological catch (ABC) for Tier 5,  $M$  is multiplied by the biomass in each region. Overfishing levels (OFL) are computed by multiplying the ABC by 0.75.

### 3.2.2 Survey and Fishery Data Reported in the Assessment

Biomass estimates are obtained from trawl surveys on the slope in the Aleutian Islands, Bering Sea, and GOA. The biomass estimates indicate that sizeable populations of giant grenadier are found in each of the three regions surveyed, but the survey time series of depths down to 1,000 m are too intermittent to show any trends in abundance. Estimates of biomass are relatively precise for giant grenadier (approximately 10 percent coefficient of variation) compared with those of many other groundfish species. This demonstrates that giant grenadier have a uniform distribution within each sampled strata. The Aleutian Islands trawl survey has not sampled deeper than 500 m since 1986, so an indirect method is used to estimate abundance. Biomass estimates are in the same order of magnitude in the Aleutian Islands, eastern Bering Sea, and GOA. The average biomass from the last three surveys is 553,557 mt in the eastern Bering Sea, 598,727 in the Aleutian Islands, and 597,884 in the GOA. Highest trawl survey catches in the GOA occur between 500 and 700 m. In the eastern Bering Sea, they are typically more common from 400 to 1,000 m. There are more large fish in the eastern Bering Sea than in the GOA. Length data is sparse in the Aleutian Islands, since the trawl survey only samples to 500 m.

One factor that could have a significant effect on the biomass estimates is the extent that giant grenadier move off the bottom into the water column. There is indirect evidence from feeding studies that giant grenadier may be semi-pelagic when searching for prey. If so, some of the population may be unavailable to the bottom trawl, which would result in an underestimate of biomass.

The annual AFSC Longline Survey samples depths from 200 to 1,000 m along the continental shelf in the Gulf of Alaska, Bering Sea, and Aleutian Islands. These data are used in calculations of biomass from 500 to 1,000 m in the Aleutian Islands because the trawl survey does not sample these deep depths. Otherwise, the survey estimates of relative abundance in weight are tracked but not used for calculations of ABC and OFL. Absolute estimates of biomass cannot be calculated because the area of attraction by the baited gear is unknown (catch per area can not be calculated); therefore, an index of abundance in numbers and weight is used for following trends. The hook-and-line survey provides an extensive time series of lengths and relative abundance. Giant grenadier relative abundance is highest in the Aleutian Islands, with an average of approximately 2.9 million; it is second highest in the Gulf of Alaska (approximately 0.9 million) and lowest in the eastern Bering Sea (approximately 0.6 million). Like lengths taken on the trawl

survey, fish caught on the hook-and-line survey in the eastern Bering Sea are larger than those in other areas.

All areas have a relatively high abundance of giant grenadier from 800 to 1,000 m, which implies the possibility that a considerable biomass may inhabit depths greater than 1,000 m. To determine if grenadiers reside in waters deeper than 1,000 m, an experimental hook-and-line survey was conducted in the Shumagin Area. The results showed that catch rates of giant grenadier were considerably less at greater than 1,000 m than at shallower depths. Female giant grenadier were much larger in size at the deep-water stations. Also, males were much more abundant in deep water and comprised as much as 42 percent of the giant grenadier catch at one station (instead of the usual 5 percent). Additional survey work needs to be done in depths greater than 1,000 m to better determine the abundance and biological characteristics of giant grenadier in these deep waters.

Beginning in 2007, length and sex for giant grenadier in the sablefish fishery has been collected by fishery observers. Results indicate that fish in the BSAI are larger than in the GOA, which agrees with fishery-independent surveys. There is no difference between the size of fish caught in pot or hook-and-line gear in the BSAI.

### 3.2.3 2012 Assessment Results and Recommendations for 2013 and 2014

To estimate ABC for Tier 5, the natural mortality ( $M$ ) is multiplied by the biomass in each region. OFLs are computed by multiplying the ABC by 0.75. Catches are not approaching OFLs or ABCs. Giant grenadier serve as a proxy for the entire grenadier species group. The 2013 and 2014 grenadier assessment recommendations for the GOA and BSAI are shown in Table 3-1 and Table 3-2, respectively.

**Table 3-1 2013–2014 Gulf of Alaska grenadier stock assessment**

Quantity/Status	Last year		This year	
	2012	2013	2013	2014
$M$ (natural mortality)	0.078	0.078	<b>0.078</b>	0.078
Specified/recommended Tier	5	5	<b>5</b>	5
Biomass	597,884	597,884	<b>597,884</b>	597,884
$F_{OFL}$ ( $F=M$ )	0.078	0.078	<b>0.078</b>	0.078
$maxF_{ABC}$ (maximum allowable = $0.75 \times F_{OFL}$ )	0.0585	0.0585	<b>0.0585</b>	0.0585
Specified/recommended $F_{ABC}$	0.0585	0.0585	<b>0.0585</b>	0.0585
Specified/recommended OFL (t)	46,635	46,635	<b>46,635</b>	46,635
Specified/recommended ABC (t)	34,976	34,976	<b>34,976</b>	34,976

The values for biomass, OFL, and ABC from Rodgveller and Clausen 2012.

**Table 3-2 2013–2014 Bering Sea and Aleutian Islands grenadier stock assessment**

Quantity/Status	Last year		This year	
	2012	2013	2013	2014
$M$ (natural mortality)	0.078	0.078	<b>0.078</b>	0.078
Specified/recommended Tier	5	5	<b>5</b>	5
Biomass	1,733,797	1,733,797	<b>1,152,284</b>	1,152,284
$F_{OFL}$ ( $F=M$ )	0.078	0.078	<b>0.078</b>	0.078
$maxF_{ABC}$ (maximum allowable = $0.75 \times F_{OFL}$ )	0.0585	0.0585	<b>0.0585</b>	0.0585
Specified/recommended $F_{ABC}$	0.0585	0.0585	<b>0.0585</b>	0.0585
Specified/recommended OFL (t)	135,236	135,236	<b>89,878</b>	89,878
Specified/recommended ABC (t)	101,427	101,427	<b>67,409</b>	67,409

The values for biomass, OFL, and ABC from Rodgveller and Clausen 2012.

### **3.3 Catch History of Grenadiers**

#### **3.3.1 Catch Estimation Methods**

Fishermen that do not deliver grenadier to shore in Alaska are not required, by federal regulation, to report catch statistics for grenadiers in Alaska because grenadiers are non-FMP species. However, catches since 1997 have been estimated for the eastern Bering Sea, Aleutian Islands, and GOA based largely on data from the Alaska Fishery Science Center's Fishery Monitoring and Analysis program. The estimates for 1997 through 2002 were determined using what was formerly called their "blend catch estimation system" (Gaichas 2002 and 2003). Although these estimates may not be as accurate as the official catch estimates determined for managed groundfish species, they are the best available. The estimates for 2003 through 2012 were computed by the NMFS Alaska Regional Office based on their Catch Accounting System, which replaced the "blend" system. All the data are presented as "grenadiers, all species combined," because observers were not instructed to identify giant grenadiers until 2005. From 2005 to 2007 many observers did not identify grenadiers to species. From 2008 to 2012 more observers identified grenadier by species, but the remainder were categorized as unidentified. Most of these were likely also giant grenadier since bottom trawl and hook-and-line surveys all show that very few Pacific and popeye grenadier are found shallower than 800 m deep, whereas giant grenadier are abundant in shallower depths.

#### **3.3.2 Catch History of Grenadiers in the BSAI**

Catch estimates for the BSAI may be more accurate than those for the GOA. In the catch estimation process, it is assumed that grenadier catch aboard observed vessels is representative of grenadier catch aboard unobserved vessels. However, observer coverage in the BSAI fisheries is considerably higher than that in the GOA. In general, smaller vessels fish in the GOA, especially in hook-and-line fisheries, and many of these vessels are not required to have observers, which could introduce a bias into the GOA estimates. This should become less of an issue in 2013, when for the first time the observer program will put observers on small vessels.

From 1997 through 2012, catches in the eastern Bering Sea have ranged from 1,631 to 5,011 mt (average 2,948 mt annually); similarly, catches in the Aleutian Islands have ranged from 1,251 to 4,383 mt (average 2,626 mt annually). Catches in the eastern Bering Sea and Aleutian Islands combined have averaged 5.574 mt annually from 1997 through 2012. Catches in the BSAI are consistently lower than catches in the GOA (average 9,838 mt). Annual catches from 1997 through 2012 are presented in Table 3-3, and the geographical distribution of BSAI grenadier catch, since identification in observer records began, is shown in Figure 3-6 and is closely associated with the shelf break bathymetry. Nearly all the grenadier catch is discarded, and the discard mortality rate is 100 percent because the pressure difference experienced by the fish when they are brought to the surface invariably causes death.

**Table 3-3 Estimated catch (mt) of grenadiers (all species combined) in the eastern Bering Sea, Aleutian Islands, and Gulf of Alaska, 1997 through 2012**

	Eastern Bering Sea	Aleutian Islands	Gulf of Alaska	Total
1997	2,964	2,887	12,029	17,881
1998	5,011	1,578	14,683	21,272
1999	4,505	2,883	11,388	18,776
2000	4,067	3,254	11,610	18,931
2001	2,294	1,460	9,685	13,439
2002	1,891	2,807	10,479	15,177
2003	2,869	3,558	12,253	18,679
2004	2,223	1,251	11,989	15,463
2005	2,633	1,795	7,251	11,679
2006	2,067	2,195	8,429	12,691
2007	1,631	1,544	9,119	12,294
2008	2,820	2,525	11,333	16,678
2009	2,902	3,739	6,326	12,968
2010	2,799	3,553	5,419	11,772
2011	4,221	2,596	8,216	15,032
2012	2,276	4,383	7,206	13,868
mean	2,948	2,626	9,838	15,413

Sources: Data covering 1997–2001 is from Gaichas 2002. Data covering 2002 is unpublished data supplied, in January 2005, by S. Gaichas of NMFS Alaska Fisheries Science Center, REFM Division, 7600 Sand Point Way NE, Seattle WA 98115-0070. Data covering the period of 2003-2010 is from the NMFS Alaska Region, Sustainable Fisheries Division, P.O. 21668, Juneau AK 99802. 2011-2012 data is from a Catch Accounting System data query accessed through the Alaska Fisheries Information Network in October 2012.

Most of the grenadier catch in the Aleutian Islands was taken in the sablefish fishery, whereas in the Bering Sea the majority came from the Greenland turbot fishery. Historically, both the sablefish and Greenland turbot fisheries have been predominantly hook-and-line, and a previous analysis of grenadier catch showed most grenadiers in the BSAI and GOA were caught on hook-and-line gear (Clausen and Gaichas 2005). In recent years, however, many sablefish and Greenland turbot fishermen in the BSAI have switched to using pots to protect their catches from whale depredation. In 2011, 60 percent of the fixed-gear eastern Bering Sea catch of sablefish was taken in pots (Hanselman et al. 2011), and it is uncertain how this change has affected grenadier catches in this area. However, analysis of sablefish pot catches in the BSAI indicates that giant grenadier is the fourth most abundant bycatch species (Hanselman et al. 2009).

The data in Table 3-4 below, show substantial catches of grenadiers are sometimes taken in the Pacific halibut fishery. However, these data should be viewed with great caution because they are based on very low rates of observer coverage in the halibut fishery. The observer program will have observers on halibut vessels for the first time in 2013, so improved data may be available in the future.

There were also large catches of grenadiers in the “other flatfish” fishery in the Aleutian Islands since 2009. Within the “other flatfish” target category, the most common target fisheries that caught grenadiers were the arrowtooth and Kamchatka flounder trawl fisheries. Catches of grenadiers in the “other flatfish”

fisheries in the GOA were less substantial and were found in the arrowtooth flounder and rex sole trawl fisheries (Rodgveller and Clausen 2012).



Figure 3-5      Incidental catch of giant grenadier

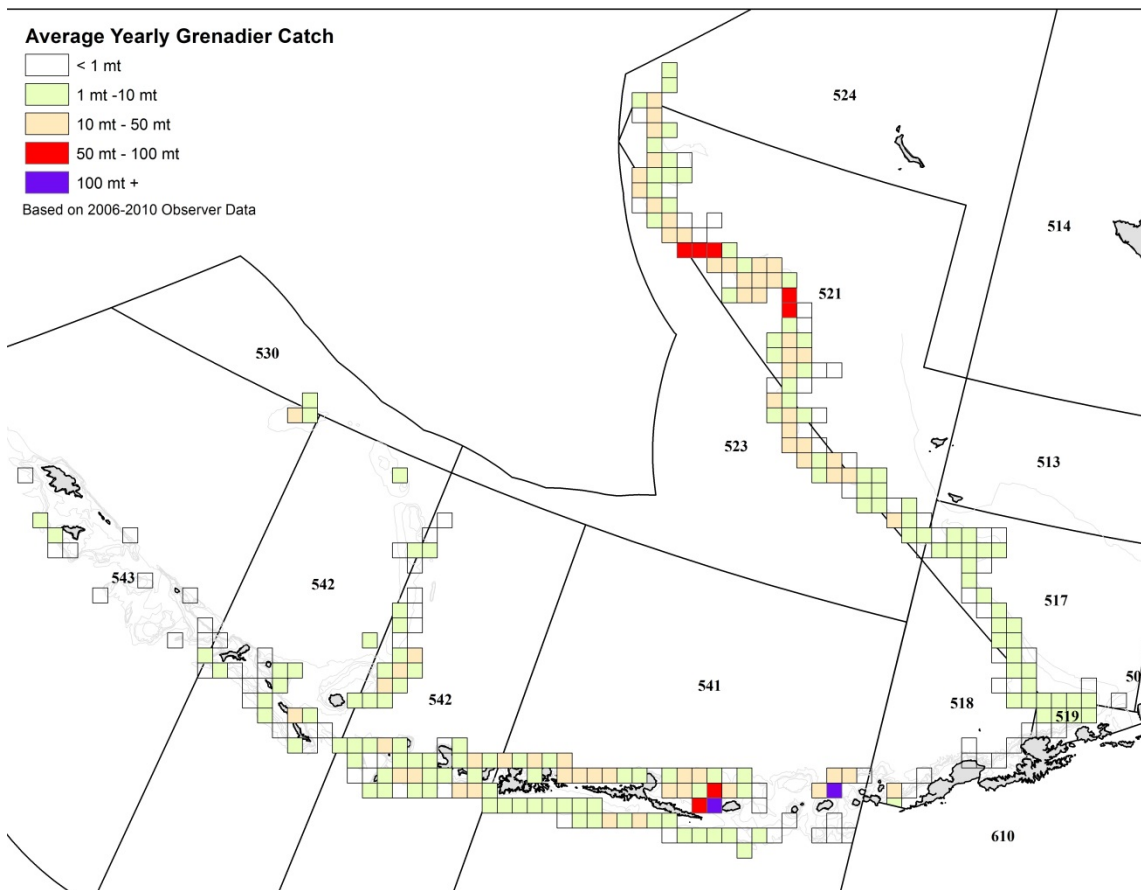


Figure 3-6 Average yearly BSAI grenadier catch, 2006–2010

**Table 3-4 Estimated catch (mt) of grenadiers (all species combined) in the eastern Bering Sea, Aleutian Islands, and Gulf of Alaska by target species/species group, 2003–2012 (Values are in mt)**

Year	Target species/species group						
	Sablefish	G. turbot	Halibut	Other flat	P. cod	Rockfish	Other sp.
<u>Eastern Bering Sea</u>							
2003	598	1,452	355	150	240	9	65
2004	287	1,315	253	79	240	22	29
2005	108	1,975	143	24	334	32	18
2006	419	1,189	180	125	126	12	16
2007	199	1,070	89	7	179	17	68
2008	113	691	1,579	82	148	3	204
2009	542	1,807	99	238	203	6	7
2010	129	1,854	102	166	416	126	6
2011	254	1,738	58	1,052	1,098	254	2
2012	148	1,085	37	704	297	2	3
<u>Aleutian Islands</u>							
2003	2,016	113	1,376	0	46	6	0
2004	748	14	414	0	13	60	1
2005	979	161	617	0	2	21	16
2006	1,083	328	170	341	120	154	0
2007	893	342	65	108	40	21	76
2008	656	67	1,044	397	26	59	276
2009	1,393	414	259	1,377	13	200	84
2010	902	175	184	1,653	222	168	205
2011	1,227	83	97	774	18	292	105
2012	982	0	64	2,824	47	39	427
<u>Gulf of Alaska</u>							
2003	9,500	0	872	1,208	5	613	54
2004	8,568	0	163	420	0	2,830	8
2005	6,371	0	505	109	0	212	54
2006	7,184	0	738	69	22	338	77
2007	8,197	0	524	115	80	198	5
2008	8,206	0	2,529	93	97	165	243
2009	4,392	0	1,431	118	58	301	26
2010	4,099	0	471	292	138	409	11
2011	5,973	0	1,186	343	69	529	115
2012	6,517	0	10	160	9	422	88

G. turbot = Greenland turbot; halibut = Pacific halibut; other flat = flatfish species other than Greenland turbot or Pacific halibut; P. cod = Pacific cod; and other sp. = other species. Source: Regional Office Catch Accounting System accessed through the Alaska Fisheries Information Network, October 1, 2012.

### 3.3.3 Catch History of Grenadiers in the GOA

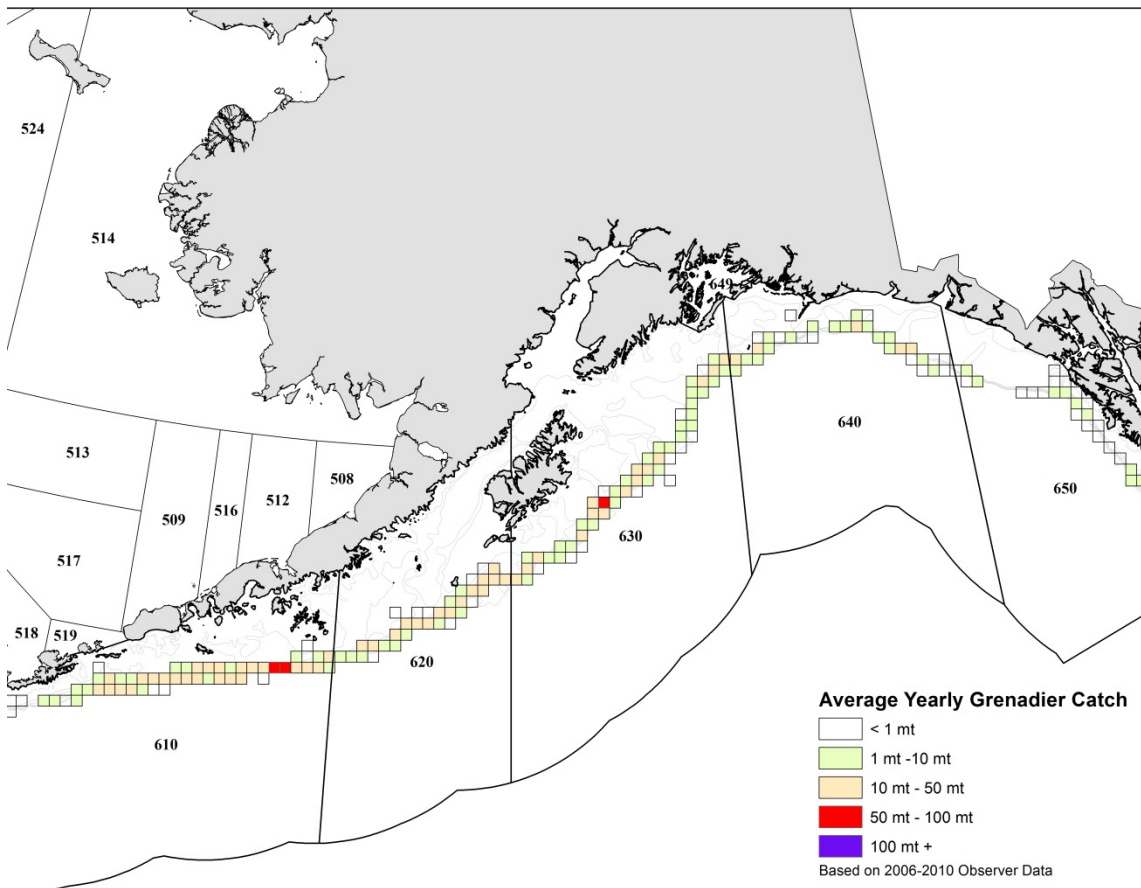
Highest catches have consistently been in the GOA (5,419 to 14,863 mt, average 9,838 mt) (Table 3-4). Most of the grenadier catch in the GOA was taken in the sablefish fishery (Figure 3-7 and Figure 3-8) and occurs in deep water off the shelf break (Figure 3-9). Substantial catches of grenadiers are sometimes taken in the Pacific halibut fishery. However, these data should be viewed with great caution because they are based on very low rates of observer coverage in the halibut fishery. The observer program will have observers on halibut vessels for the first time in 2013, so improved data will be available in the future.



**Figure 3-7 Grenadier and sablefish on AFSC longline survey**



Figure 3-8 Giant grenadier on AFSC longline survey



**Figure 3-9 Average yearly GOA grenadier catch, 2006–2010**

### 3.3.4 Attempts to Develop a Market

Because of the large biomass of giant grenadier on the continental slope, research has been done to develop marketable products from this species (Crapo et al. 1999a and 1999b). There have been several known attempts to develop a fishery in Alaska. The first was an endeavor to process hook-and-line-caught giant grenadier for surimi at the port of Kodiak in 1998.<sup>3</sup> This small effort was apparently unsuccessful, as it ended in 1999. The second, also from the port of Kodiak, was an exploratory effort in 2005 using trawls to target giant grenadier and develop a fillet and roe market.<sup>4</sup> This venture was not continued in 2006. From 2009 to 2011 a total of approximately 1,400 mt were retained for processing.<sup>5</sup> Personal communications with the industry indicate that at least some of this catch was sold as headed and gutted and tail cut off (see Figure 3-10 through Figure 3-12), and at least some of the retained grenadier were incidentally caught (see Figure 3-5) in other groundfish fisheries and not from a targeted fishery. Because

<sup>3</sup> J. Ferdinand, National Marine Fisheries Service, Alaska Fisheries Science Center, REFM Division, 7600 Sand Point Way NE, Seattle WA 98115-0070. Personal communication, September 2004.

<sup>4</sup> T. Pearson, Kodiak Fisheries Research Center, National Marine Fisheries Service, Sustainable Fisheries, 302 Trident Way, Room 212, Kodiak AK 99615. Personal communication, October 2005.

<sup>5</sup> J. Keaton, National Marine Fisheries Service, Regional Office, P.O. Box 21668, 709 W. 9<sup>th</sup> St., Juneau, AK, 99802-1668, Personal communication, October 2012.

it is such a low value product, it is likely that much of the retained catch was caught incidentally in other target fisheries such as sablefish and Greenland turbot fisheries.



**Figure 3-10** Frozen block of giant grenadier



**Figure 3-11** Giant grenadier, headed, gutted, collar and tail removed



**Figure 3-12 Giant grenadier fillets**

### **3.3.5 Vulnerability to Overfishing**

Because of the large abundance of giant grenadier in both the BSAI and GOA, overharvest does not appear to be a problem at present. However, if future catches increase due to increased quotas of sablefish or Greenland turbot or due to the development of a fishery, they may be vulnerable to overfishing because 1) the vast majority of the giant grenadier catch is discarded, and the discard mortality rate is 100 percent; 2) female giant grenadier greatly outnumber males at the depths where the sablefish and Greenland turbot fisheries operate, which means there is a disproportionate removal of females; 3) like many deep-sea fish, giant grenadier are long-lived, slow growing, and late maturing, which are traits that do not support high rates of fishing. Recent studies in other parts of the world have shown that deep-sea fisheries have rapidly depleted a number of species, including grenadiers, and these species have not recovered.

The vulnerability of a stock or stock complex is an important consideration in the designation as an ecosystem component or as “in the fishery.” National Standard 1 (NS1) defines vulnerability for a stock as a combination of its productivity, which depends upon its life history characteristics, and its susceptibility to the fishery. Productivity refers to the capacity of the stock to produce maximum sustainable yield and to recover if the population is depleted. Susceptibility is the potential for the stock to be impacted by the fishery, which includes direct captures, as well as indirect impacts to the fishery (e.g., loss of habitat quality). NS1 guidelines advise regional fishery management Councils to, in consultation with their SSCs, analyze the vulnerability of stocks in stock complexes where possible.

Stock assessment scientists from the Alaska Fisheries Science Center prepared a draft vulnerability analysis for a number of Alaskan stocks and stock complexes, including giant grenadier and presented the results in Appendix 3 to the 2009 SAFE report (Ormseth and Spencer 2009). The procedure used was a “productivity-susceptibility analysis.” The results indicate susceptibility was highest for target stocks (highest scores were for walleye pollock and Pacific cod), but they were also highly productive, which

gave them moderate vulnerability scores. In the GOA, giant grenadier received a moderate vulnerability score, between Pacific cod and walleye Pollock. In the BSAI, they also received a moderate score between Pacific cod and Pacific ocean perch.

Because of the similarities in vulnerability scores between target stocks and giant grenadier, the authors concluded that management measures appropriate for target species (such as ACLs and AMs) should also be applied to grenadiers (Ormseth and Spencer 2009).

### **3.4 Effects of the Alternatives**

Ecosystems consist of communities of organisms interacting with their physical environment. Within marine ecosystems, competition, predation, and environmental disturbance cause natural variation in recruitment, survivorship, and growth of fish stocks. Human activities, including commercial fishing, can also influence the structure and function of marine ecosystems. Fishing may change predator-prey relationships and community structure, introduce foreign species, affect trophic diversity, alter genetic diversity, alter habitat, and damage benthic habitats.

Nearly all the grenadier catch is discarded, and the discard mortality rate is 100 percent because the pressure difference experienced by the fish when they are brought to the surface causes death. Because almost all grenadiers presently caught in the sablefish and Greenland turbot fisheries are discarded and do not survive, this constitutes a major input of dead organic material to the ecosystem that would not otherwise be there.

### 3.5 Impacts of the Alternatives on Grenadiers and Groundfish Target Species

At present there is no directed fishing for grenadiers. Grenadiers are taken as incidental catch in the directed commercial groundfish and Pacific halibut fisheries, most commonly in the sablefish and Greenland turbot fisheries. A description of and the condition of the species that could be effected are included in the Council's SAFE reports for the BSAI and GOA.

**Table 3-5 Criteria used to determine significance of effects on grenadiers and groundfish target species**

Effect	Criteria			
	Significantly Adverse	Insignificant	Significantly Beneficial	Unknown
Stock Biomass: potential for increasing and reducing stock size	Changes in fishing mortality are expected to jeopardize the ability of the stock to sustain itself at or above its MSST (minimum standing stock threshold)	Changes in fishing mortality are expected to maintain the stock's ability to sustain itself above MSST	Changes in fishing mortality are expected to enhance the stock's ability to sustain itself at or above its MSST	Magnitude and/or direction of effects are unknown
Fishing mortality	Reasonably expected to jeopardize the capacity of the stock to yield sustainable biomass on a continuing basis.	Reasonably expected not to jeopardize the capacity of the stock to yield sustainable biomass on a continuing basis.	Action allows the stock to return to its unfished biomass.	Magnitude and/or direction of effects are unknown
Spatial or temporal distribution	Reasonably expected to adversely affect the distribution of harvested stocks either spatially or temporally such that it jeopardizes the ability of the stock to sustain itself.	Unlikely to affect the distribution of harvested stocks either spatially or temporally such that it has an effect on the ability of the stock to sustain itself.	Reasonably expected to beneficially affect the harvested stocks through spatial or temporal increases in abundance such that it enhances the ability of the stock to sustain itself.	Magnitude and/or direction of effects are unknown
Change in prey availability	Evidence that the action may lead to changed prey availability such that it jeopardizes the ability of the stock to sustain itself.	Evidence that the action will not lead to a change in prey availability such that it jeopardizes the ability of the stock to sustain itself.	Evidence that the action may result in a change in prey availability such that it enhances the ability of the stock to sustain itself.	Magnitude and/or direction of effects are unknown

The sablefish and Greenland turbot fisheries take the most giant grenadier as bycatch, so the Fishery Effects section in the sablefish Stock Assessment is applicable to giant grenadier and is an indication of what the effects might be if a directed fishery for giant grenadier were to develop; the sablefish assessment includes more details on ecosystem considerations than the Greenland turbot document.

Under Alternative 1, the no action alternative, grenadiers would continue as non-FMP species without any harvest limitations or recordkeeping and reporting requirements. Since the present and past harvests of grenadiers taken incidentally are well below the current ABCs calculated for grenadiers, there would be no significant effects (either adverse or beneficial) on the stock biomass, fishing mortality, spatial or temporal distribution, or changes in prey availability for grenadier and groundfish target species in either the BSAI or GOA (Table 3-5).

Under Alternative 2, which would include grenadier in both the BSAI and GOA groundfish FMPs as target species “in the fishery,” OFLs, ABCs, TACs, other management measures, and recordkeeping and reporting requirements would need to be established for grenadiers. Since the present and past harvests of grenadiers taken incidentally are well below the current ABCs calculated for grenadiers, there would be no significant effects (either adverse or beneficial) on the stock biomass, fishing mortality, spatial or temporal distribution, or changes in prey availability for grenadier and groundfish target species in either the BSAI or GOA. In the BSAI establishing a TAC for grenadiers at the ABC or incidental catch level could reduce the TAC levels for other, more valuable species and is discussed in Sections 5. If the TAC in the BSAI were set at an estimated mean incidental catch level of 6,495 mt, the cumulative TACs for other groundfish species could be reduced by as much as 0.32 percent. Such a reduction is not considered a significant socioeconomic effect.

Under Alternative 3, which would include grenadier in both the BSAI and GOA groundfish FMPs as an “ecosystem component,” OFLs, ABCs, and TACs would not need to be established. However, other management measures could be, and recordkeeping and reporting requirements would need to be established for grenadiers. Since the present and past harvests of grenadiers taken incidentally are well below the current ABCs calculated for grenadiers, there would be no significant effects (either adverse or beneficial) on the stock biomass, fishing mortality, spatial or temporal distribution, or changes in prey availability for grenadier and groundfish target species in either the BSAI or GOA. There would be no significant (either beneficial or adverse) socioeconomic effects on grenadiers or other groundfish targets in either the BSAI or GOA.

Under Alternative 4, which would include grenadier in the BSAI groundfish FMP as an “ecosystem component” and in the GOA groundfish FMP as a designated target species group “in the fishery,” the effects would be the same as described under Alternative 3 in the BSAI and as under Alternative 2 in the GOA. Since the present and past harvests of grenadiers taken incidentally are well below the current ABCs calculated for grenadiers, there would be no significant effects (either adverse or beneficial) on the stock biomass, fishing mortality, spatial or temporal distribution, or changes in prey availability for grenadier and groundfish target species in either the BSAI or GOA. There would be no significant (either beneficial or adverse) socioeconomic effects on grenadiers or other groundfish targets in either the BSAI or GOA.

### **3.6 Impacts of the Alternatives on Ecosystem Components (including prohibited species)**

There are two general classes of ecosystem component species included in the BSAI and GOA groundfish FMPs; prohibited species (listed in Table 2b to part 679) and forage fish (listed in Table 2c to part 679). Prohibited species include crab, salmon, herring, Pacific halibut, and steelhead trout. These species were originally included in the FMPs as prohibited species (meaning none can be retained, except where authorized or required, and must be discarded at sea with as little damage as practicable) since at the time the FMPs were implemented these fisheries had already been developed and were fully utilized. With some oversight by NMFS, these fisheries are managed by the State of Alaska and the International Pacific Halibut Commission. With the implementation of Amendment 96 to the BSAI groundfish FMP and Amendment 87 to the GOA groundfish FMP (75 FR 61639, October 6, 2010), these prohibited species were designated as “ecosystem component” species. These amendments also included over 60 species in the forage fish category as “ecosystem component” species. The forage fish category was created in 1998 in recognition of their importance in the food web. Forage fish species are poorly sampled with standard survey methods, and the numbers of species and their biomass is not known. Forage fish perform a critical role in the complex ecosystem functions of the BSAI and GOA by providing the transfer of energy from primary or secondary producers to higher trophic levels. Directed fishing for forage fish is

prohibited and the maximum retainable amount (MRA) of forage fish is limited to 2 percent in the aggregate.

Under Alternative 1, the no action alternative (status quo), grenadiers would continue as non-FMP species without any harvest limitations or recordkeeping and reporting requirements. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries that are subject to prohibited species catch (PSC) limitations, which would continue. Absent the development of directed fishing for grenadiers, there would be no significant impacts (either beneficial or adverse) on prohibited species. Grenadiers could be used as a basis species for the retention of forage fish but the MRA limit would remain at 2 percent. Therefore there would be no significant impacts (either beneficial or adverse) on forage fish species. There would be no significant (either beneficial or adverse) socioeconomic effects on prohibited species or forage fish in either the BSAI or GOA under the status quo (see Table 3-6).

**Table 3-6 Criteria used to determine significance of effects on ecosystem component (including prohibited) species**

<b>No impact</b>	Nominal incidental take of the ecosystem component species in question.
<b>Adverse impact</b>	There are incidental takes of the ecosystem component prohibited species in question
<b>Beneficial impact</b>	Natural at-sea mortality of the ecosystem component species in question would be reduced—perhaps by the harvest of a predator or by the harvest of a species that competes for prey.
<b>Significantly adverse impact</b>	An action that diminishes protections afforded to the ecosystem component species in the groundfish fisheries would be a significantly adverse impact.
<b>Significantly Beneficial impact</b>	No benchmarks are available for significantly beneficial impact of the groundfish fishery on the ecosystem component species, and significantly beneficial impacts are not defined for these species.
<b>Unknown impact</b>	Not applicable

Under Alternative 2, which would include grenadier in both the BSAI and GOA groundfish FMPs as target species “in the fishery,” OFLs, ABCs, TACs, other management measures, and recordkeeping and reporting requirements would need to be established for grenadiers. PSC limits would need to be established should a directed fishery for grenadiers develop. Since the overall PSC limits in the BSAI and GOA would not be expected to increase, there would be no significant impacts (either beneficial or adverse) on prohibited species. In the event grenadiers were open to directed fishing, grenadiers could be used as a basis species for the retention of forage fish but the MRA limit would remain at 2 percent. Therefore there would be no significant impacts (either beneficial or adverse) on forage fish species. There would be no significant (either beneficial or adverse) socioeconomic effects on prohibited species or forage fish in either the BSAI or GOA under Alternative 2.

Under Alternative 3, which would include grenadier in both the BSAI and GOA groundfish FMPs as an “ecosystem component,” OFLs, ABCs, and TACs would not need to be established. However, other management measures could be, and recordkeeping and reporting requirements would need to be established for grenadiers. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries that are subject to PSC limitations, which would continue. Therefore there would be no significant impacts (either beneficial or adverse) on prohibited species. As an “ecosystem component” grenadiers would be closed to directed fishing and could not be used as a basis species for the retention of forage fish. Therefore there would be no significant impacts (either beneficial or adverse) on forage fish species. There would be no significant (either beneficial or adverse) socioeconomic effects on prohibited species or forage fish in either the BSAI or GOA under Alternative 3.

Under Alternative 4, which would include grenadier in the BSAI groundfish FMP as an “ecosystem component” and in the GOA groundfish FMP as a designated target species group “in the fishery,” the effects would be the same as described under Alternative 3 in the BSAI and as under Alternative 2 in the GOA. Therefore there would be no significant impacts (either beneficial or adverse) on prohibited and forage fish species. There would be no significant (either beneficial or adverse) socioeconomic effects on prohibited species or forage fish in either the BSAI or GOA under Alternative 4.

### **3.7 Impacts of the Alternatives on Marine Mammals (including endangered species)**

A number of concerns may be related to marine mammals and the potential impacts of fishing. For individual species, these concerns include—

- listing as endangered or threatened under the Endangered Species Act (ESA);
- protection under the Marine Mammal Protection Act;
- announcement as candidate or being considered as candidates for ESA listings;
- declining populations in a manner of concern to state or Federal agencies;
- experiencing large PSC or other mortality related to fishing activities; or
- being vulnerable to direct or indirect adverse effects from some fishing activities.

Marine mammals have been given various levels of protection under the current fishery management plans of the Council and are the subjects of continuing research and monitoring to further define the nature and extent of fishery impacts on these species. The Alaska groundfish harvest specifications environmental impact statement (NMFS 2007) provides the most recent information regarding fisheries interactions with marine mammals. The most recent status information is available in the 2011 Marine Mammal Stock Assessment Reports (Allen and Angliss 2012). In the action area, the entire BSAI and GOA management areas, six species of pinnipeds, 15 species of cetaceans, and the northern sea otter are known to occur. Of the species listed under the ESA and present in the action area, several species may be adversely affected by commercial groundfish fishing. These include Steller sea lions, humpback whales, fin whales, and sperm whales (NMFS 2006; NMFS 2010).

Under Alternative 1, the no action alternative (status quo), grenadiers would continue as non-FMP species without any harvest limitations or recordkeeping and reporting requirements. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries that are subject to take limitations, which would continue. Absent the development of directed fishing for grenadiers, there would be no significant impacts (either beneficial or adverse) on marine mammals, including those ESA-listed species, with respect to the potential for incidental takes and entanglement in marine debris, prey availability, or disturbances from fishing operations not already considered. There are no significant (either beneficial or adverse) socioeconomic effects on marine mammals in either the BSAI or GOA under the status quo (see Table 3-7).

Under Alternative 2, which would include grenadier in both the BSAI and GOA groundfish FMPs as target species “in the fishery,” OFLs, ABCs, TACs, other management measures, and recordkeeping and reporting requirements would need to be established for grenadiers. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries that are subject to take limitations, which would continue. Absent the development of directed fishing for grenadiers, there would be no significant impacts (either beneficial or adverse) on marine mammals, including those ESA-listed species, with respect to the potential for incidental takes and entanglement in marine debris, prey availability, or disturbances from fishing operations not already considered. There would be no significant (either

beneficial or adverse) socioeconomic effects on marine mammals in either the BSAI or GOA under Alternative 2.

**Table 3-7 Criteria used to determine significance of effects on marine mammals**

	<b>Incidental take and entanglement in marine debris</b>	<b>Prey availability</b>	<b>Disturbance</b>
<b>Adverse impact</b>	Mammals are taken incidentally to fishing operations or become entangled in marine debris.	Fisheries reduce the availability of marine mammal prey.	Fishing operations disturb marine mammals.
<b>Beneficial impact</b>	There is no beneficial impact.	Generally, there are no beneficial impacts.	There is no beneficial impact.
<b>Significantly adverse impact</b>	Incidental take is more than potential biological removal (PBR) or is considered major in relation to estimated population when PBR is undefined.	Competition for key prey species likely to constrain foraging success of marine mammal species causing population decline.	Disturbance of mammal is such that population is likely to decrease.
<b>Significantly beneficial impact</b>	Not applicable	Not applicable	Not applicable
<b>Insignificant</b>	Neither significantly beneficial nor adverse.	Neither significantly beneficial nor adverse.	Neither significantly beneficial nor adverse. Insufficient information as to what constitutes disturbance.

Under Alternative 3, which would include grenadier in both the BSAI and GOA groundfish FMPs as an “ecosystem component,” OFLs, ABCs, and TACs would not need to be established. However, other management measures could be, and recordkeeping and reporting requirements would need to be established for grenadiers. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries that are subject to take limitations, which would continue. As an “ecosystem component” grenadiers would be closed to directed fishing and there would be no significant impacts (either beneficial or adverse) on marine mammals, including those ESA-listed species, with respect to the potential for incidental takes and entanglement in marine debris, prey availability, or disturbances from fishing operations not already considered. There would be no significant (either beneficial or adverse) socioeconomic effects on marine mammals in either the BSAI or GOA under Alternative 3.

Under Alternative 4, which would include grenadier in the BSAI groundfish FMP as an “ecosystem component” and in the GOA groundfish FMP as a designated target species group “in the fishery,” the effects would be the same as described under Alternative 3 in the BSAI and as under Alternative 2 in the GOA. Therefore there would be no significant impacts (either beneficial or adverse) on marine mammals, including those ESA-listed species, with respect to the potential for incidental takes and entanglement in marine debris, prey availability, or disturbances from fishing operations not already considered. There would be no significant (either beneficial or adverse) socioeconomic effects on marine mammals in either the BSAI or GOA under Alternative 4.

### 3.8 Impacts of the Alternatives on Seabirds (including endangered species)

Thirty-eight species of seabirds breed in Alaska. Breeding populations are estimated to contain 36 million individual birds in Alaska, and total population size (including subadults and nonbreeders) is estimated to be approximately 30 percent higher. Five additional species that breed elsewhere but occur in Alaskan waters during the summer months contribute another 30 million birds.

As noted in the PSEIS (NMFS 2004), seabird life history includes low reproductive rates, low adult mortality rates, long life span, and delayed sexual maturity. These traits make seabird populations extremely sensitive to changes in adult survival and less sensitive to fluctuations in reproductive effort. The problem with attributing population changes to specific impacts is that, because seabirds are long-lived animals, it may take years or decades before relatively small changes in survival rates result in observable impacts on the breeding population.

More information on seabirds in Alaska's exclusive economic zone may be found in several NMFS, Council, and U. S. Fish and Wildlife Service (USFWS) documents:

- The URL for the USFWS Migratory Bird Management program is at: <http://alaska.fws.gov/mbmp/mbm/index.htm>
- Section 3.7 of the PSEIS (NMFS 2004) provides background on seabirds in the action area and their interactions with the fisheries. This may be accessed at [http://www.alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt\\_3/chpt\\_3\\_7.pdf](http://www.alaskafisheries.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_7.pdf)
- The annual Ecosystems Considerations chapter of the SAFE reports has a chapter on seabirds. Back issues of the Ecosystem SAFE reports may be accessed at <http://www.afsc.noaa.gov/REFM/REEM/Assess/Default.htm>.
- The Seabird Fishery Interaction Research webpage of the Alaska Fisheries Science Center:
- <http://www.afsc.noaa.gov/REFM/REEM/Seabirds/Default.php>
- The NMFS Alaska Region's Seabird Incidental Take Reduction webpage:
- <http://alaskafisheries.noaa.gov/protectedresources/seabirds.htm>
- The BSAI and GOA groundfish FMPs each contain an appendix dealing with marine mammal and seabird populations that interact with the fisheries. The FMPs may be accessed from the Council's home page at <http://alaskafisheries.noaa.gov/npfmc/>
- Washington Sea Grant has several publications on seabird takes, and technologies and practices for reducing them: <http://www.wsg.washington.edu/mas/resources/seabird.html>
- Seabirds and fishery impacts are described in Chapter 9 of the Alaska Groundfish Harvest Specifications EIS (NMFS 2007).

Several species of conservation concern occur in the GOA. Short-tailed albatross is listed as endangered under the ESA, and Steller's eider is listed as threatened. Kittlitz's murrelet is a candidate species for listing under the ESA, and the USFWS is currently working on a 12-month finding for black-footed albatross.

Under Alternative 1, the no action alternative (status quo), grenadiers would continue as non-FMP species without any harvest limitations or recordkeeping and reporting requirements. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries. Absent the development of directed fishing for grenadiers, there would be no significant impacts (either beneficial or adverse) on seabirds, including those ESA-listed species, with respect to the potential for incidental takes, prey availability, or disturbances from fishing operations on benthic habitat not already considered. There would be no

significant (either beneficial or adverse) socioeconomic effects on seabirds in either the BSAI or GOA under the status quo (see Table 3-8).

**Table 3-8 Criteria used to determine significance of effects on seabirds**

	<b>Incidental take</b>	<b>Prey availability</b>	<b>Benthic habitat</b>
<b>Insignificant Beneficial or Adverse</b>	No substantive change in takes of seabirds during the operation of fishing gear.	No substantive change in forage available to seabird populations.	No substantive change in gear impact on benthic habitat used by seabirds for foraging.
<b>Adverse impact</b>	Non-zero take of seabirds by fishing gear.	Reduction in forage fish populations, or the availability of forage fish, to seabird populations.	Gear contact with benthic habitat used by benthic feeding seabirds reduces amount or availability of prey.
<b>Beneficial impact</b>	No beneficial impact can be identified.	Availability of offal from fishing operations or plants may provide additional, readily accessible, sources of food.	No beneficial impact can be identified.
<b>Significantly adverse impact</b>	Trawl and hook-and-line take levels increase substantially from the baseline level, or level of take is likely to have a population level impact on species.	Food availability decreased substantially from baseline such that seabird population level survival or reproduction success is likely to decrease.	Impact to benthic habitat decreases seabird prey base substantially from baseline such that seabird population level survival or reproductive success is likely to decrease. (ESA-listed eider impacts may be evaluated at the population level).
<b>Significantly beneficial impact</b>	No threshold can be identified.	Food availability increased substantially from baseline such that seabird population level survival or reproduction success is likely to increase.	No threshold can be identified.
<b>Unknown impacts</b>	Insufficient information available on take rates or population levels.	Insufficient information available on abundance of key prey species or the scope of fishery impacts on prey.	Insufficient information available on the scope or mechanism of benthic habitat impacts on food web.

Under Alternative 2, which would include grenadier in both the BSAI and GOA groundfish FMPs as target species “in the fishery,” OFLs, ABCs, TACs, other management measures, and recordkeeping and reporting requirements would need to be established for grenadiers. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries. Take limits in effect for ESA-listed seabirds would remain unchanged by this alternative. Absent the development of directed fishing for grenadiers there would be no significant impacts (either beneficial or adverse) on seabirds, including those ESA-listed species, with respect to the potential for incidental takes, prey availability, or disturbances from fishing operations on benthic habitat not already considered. There would be no significant (either beneficial or adverse) socioeconomic effects on seabirds in either the BSAI or GOA under Alternative 2.

Under Alternative 3, which would include grenadier in both the BSAI and GOA groundfish FMPs as an “ecosystem component,” OFLs, ABC, TACs, would not need to be established. However, other management measures could be, and recordkeeping and reporting requirements would need to be established for grenadiers. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries. Take limits in effect for ESA listed seabirds would remain unchanged by this alternative. As an “ecosystem component” grenadiers would be closed to directed fishing and there

would be no significant impacts (either beneficial or adverse) on seabirds, including those ESA-listed species, with respect to the potential for incidental takes, prey availability, or disturbances from fishing operations on benthic habitat not already considered. There would be no significant (either beneficial or adverse) socioeconomic effects on seabirds in either the BSAI or GOA under Alternative 3.

Under Alternative 4, which would include grenadier in the BSAI groundfish FMP as an “ecosystem component” and in the GOA groundfish FMP as a designated target species group “in the fishery,” the effects would be the same as described under Alternative 3 in the BSAI and as under Alternative 2 in the GOA. Therefore there would be no significant impacts (either beneficial or adverse) on seabirds, including those ESA listed species, with respect to the potential for incidental takes, prey availability, or disturbances from fishing operations on benthic habitat not already considered. There are no significant (either beneficial or adverse) socioeconomic effects on seabirds in either the BSAI or GOA under Alternative 4.

### **3.9 Impacts of the Alternatives on Essential Fish Habitat**

Fishing operations may change the abundance or availability of certain habitat features used by managed fish species to spawn, breed, feed, and grow to maturity. These changes may reduce or alter the abundance, distribution, or productivity of species. The effects of fishing on habitat depend on the intensity of fishing, the distribution of fishing with different gears across habitats, and the sensitivity and recovery rates of specific habitat features. In 2005, NMFS and the Council completed the EIS for Essential Fish Habitat Identification and Conservation in Alaska (EFH EIS; NMFS 2005). The EFH EIS evaluates the long term effects of fishing on benthic habitat features, as well as the likely consequences of those habitat changes for each managed stock based on the best available scientific information. Maps and descriptions of EFH for the GOA groundfish species are available in the EFH EIS. This document also describes the importance of benthic habitat to different groundfish species and the impacts of different types of fishing gear on benthic habitat.

The primary fishery for sablefish in the GOA is with hook-and-line gear. Relative to trawl gear, a significant effect of hook-and-line gear on bedrock, cobbles, or sand is unlikely. Pot gear is used to catch much of the quota in the Aleutian Islands and Bering Sea. Pots may have a greater impact on bottom habitat than hook-and-line gear; although, little is known about the effects of hook-and-line or pot gear on bottom habitat. The EFH EIS (NMFS 2005) concluded that “the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST).”

Under Alternative 1, the no action alternative (status quo), grenadiers would continue as non-FMP species without any harvest limitations or recordkeeping and reporting requirements. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries. Absent the development of directed fishing for grenadiers, there would be no significant impacts (either beneficial or adverse) on EFH with respect to the potential for disruption or habitat damage from fishing operations not already considered. There would be no significant (either beneficial or adverse) socioeconomic effects on EFH in either the BSAI or GOA under the status quo (see Table 3-9).

Under Alternative 2, which would include grenadier in both the BSAI and GOA groundfish FMPs as target species “in the fishery,” OFLs, ABCs, TACs, other management measures, and recordkeeping and reporting requirements would need to be established for grenadiers. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries. Absent the development of directed fishing for grenadiers there would be no significant impacts (either beneficial or adverse) on EFH with respect to the potential for disruption or habitat damage from fishing operations not already considered.

There would be no significant (either beneficial or adverse) socioeconomic effects on EFH in either the BSAI or GOA under Alternative 2.

**Table 3-9 Criteria used to determine significance of effects on essential fish habitat (EFH)**

<b>No impact</b>	Fishing activity has no impact on EFH.
<b>Adverse impact</b>	Fishing activity causes disruption or damage of EFH.
<b>Beneficial impact</b>	Beneficial impacts of this action cannot be identified.
<b>Significantly adverse impact</b>	Fishery induced disruption or damage of EFH that is more than minimal and not temporary.
<b>Significantly beneficial impact</b>	No threshold can be identified.
<b>Unknown impact</b>	No information is available regarding fishing activity on EFH.

Under Alternative 3, which would include grenadier in both the BSAI and GOA groundfish FMPs as an “ecosystem component,” OFLs, ABCs, and TACs would not need to be established. However, other management measures could be, and recordkeeping and reporting requirements would need to be established for grenadiers. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries. As an “ecosystem component” grenadiers would be closed to directed fishing, and there would be no significant impacts (either beneficial or adverse) on EFH with respect to the potential for disruption or habitat damage from fishing operations not already considered. There would be no significant (either beneficial or adverse) socioeconomic effects on EFH in either the BSAI or GOA under Alternative 3.

Under Alternative 4, which would include grenadier in the BSAI groundfish FMP as an “ecosystem component” and in the GOA groundfish FMP as a designated target species group “in the fishery,” the effects would be the same as described under Alternative 3 in the BSAI and as under Alternative 2 in the GOA. Therefore there would be no significant impacts (either beneficial or adverse) on EFH with respect to the potential for disruption or habitat damage from fishing operations not already considered. There would be no significant (either beneficial or adverse) socioeconomic effects on EFH in either the BSAI or GOA under Alternative 4.

### 3.10 Impacts of Options 1 and 2 on the Environment

Options 1 and 2 would specify the grenadier species to be included in the BSAI and GOA groundfish FMPs under Alternatives 2, 3, and 4. Options 1 and 2 would not be applicable to Alternative 1, the no action alternative. Option 1 would include only one species of grenadier, the giant grenadier. Option 2 would include three species of grenadier—giant, popeye, and Pacific grenadier. Under Alternatives 2, 3, and 4, there would be no significant (either beneficial or adverse) socioeconomic effects and no significant impacts on the environmental components analyzed—grenadiers and groundfish target species, ecosystem components, marine mammals, seabirds, and essential fish habitat or either option.

### 3.11 Cumulative Effects

This section analyzes the cumulative effects of the actions considered in this environmental assessment. A cumulative effects analysis includes the effects of past, present, and reasonably foreseeable future action (RFFA). The past and present actions are described in several documents and are incorporated by

reference. These include the BSAI and GOA SAFE reports and appendices (NPFMC 2010a and b, 2011a and b, and 2012a and b), a discussion paper on the inclusion of grenadiers in the FMPs (NMFS 2011c), the PSEIS (NMFS 2004), the EFH EIS (NMFS 2005), and the Harvest Specifications EIS (NMFS 2007). This analysis provides a brief review of the RFFA that may affect environmental quality and result in cumulative effects. Future effects include harvest of federally managed fish species, impacts on prohibited and forage fish species, marine mammals and seabirds, current habitat protection from Federal fishery management measures, efforts to protect endangered species by other Federal agencies, and other non-fishing activities and natural events. The actions under consideration would have no significant impacts on public health or safety.

The most recent analysis of RFFAs for the groundfish fisheries is in the Harvest Specifications EIS (NMFS 2007). No additional RFFAs have been identified for this proposed action. The RFFAs are described in the Harvest Specifications EIS Section 3.3 (NMFS 2007), are applicable for this analysis, and are incorporated by reference. A summary table of these RFFAs is provided below (Table 3-10). The table summarizes the RFFAs identified applicable to this analysis that are likely to have an impact on a resource component within the action area and time frame. Actions are understood to be human actions (e.g., a proposed rule to designate northern right whale critical habitat in the Pacific Ocean), as distinguished from natural events (e.g., an ecological regime shift). CEQ regulations require a consideration of actions, whether taken by a government or by private persons, which are reasonably foreseeable. This is interpreted as indicating actions that are more than merely possible or speculative. Actions have been considered reasonably foreseeable if some concrete step has been taken toward implementation, such as a Council recommendation or the publication of a proposed rule. Actions simply under consideration have not generally been included because they may change substantially or may not be adopted, and so cannot be reasonably described, predicted, or foreseen. Identification of actions likely to impact a resource component within this action's area and time frame will allow the public and Council to make a reasoned choice among alternatives.

Reasonably foreseeable future actions that may affect target and prohibited species are shown in Table 3-10. These actions include but are not limited to ecosystem management, rationalization, and traditional management tools that are likely to improve the protection and management of grenadiers and groundfish target species, prohibited and forage fish species, marine mammals and seabirds, and essential fish habitat and are not likely to result in significant effects when combined with the direct and indirect effects. NMFS is conducting or participating in several research projects to improve understanding of grenadier biology and life history, the role of grenadiers in the ecosystem, grenadier stock assessments, fisheries interactions, and gear modifications to reduce PSC. Other government actions and private actions may increase pressure on the sustainability of target and prohibited fish stocks either through extraction or changes in the habitat or may decrease the market through aquaculture competition, but it is not clear that these would result in significant cumulative effects. Any increase in extraction of target species would likely be offset by Federal management. These are further discussed in Sections 4.1.3 and 7.3 of the Harvest Specifications EIS (NMFS 2007).

Reasonably foreseeable future actions for non-specified and forage species include ecosystem-sensitive management, traditional management tools, and private actions. Impacts of ecosystem-sensitive management and traditional management tools are likely to be beneficial as more attention is brought to the taking of non-specified species in the fisheries and accounting for such takes.

**Table 3-10 Reasonably Foreseeable Future Actions**

Ecosystem-sensitive management	<ul style="list-style-type: none"> <li>Increasing understanding of the interactions between ecosystem components and ongoing efforts to bring these understandings to bear in stock assessments</li> <li>Increasing protection of ESA-listed and other non-target species components of the ecosystem</li> <li>Increasing integration of ecosystems considerations into fisheries decision-making</li> </ul>
Fishery rationalization	<ul style="list-style-type: none"> <li>Continuing rationalization of Federal fisheries off Alaska</li> <li>Fewer, more profitable, fishing operations</li> <li>Better harvest, PSC, and bycatch control</li> <li>Rationalization of groundfish in waters in and off Alaska</li> <li>Expansion of community participation in rationalization programs</li> </ul>
Traditional management tools	<ul style="list-style-type: none"> <li>Authorization of groundfish fisheries in future years</li> <li>Increasing enforcement responsibilities</li> <li>Technical and program changes that will improve enforcement and management</li> </ul>
Other Federal, state, and international agencies	<ul style="list-style-type: none"> <li>Future exploration and development of offshore mineral resources</li> <li>Reductions in United States Coast Guard fisheries enforcement activities</li> <li>Continuing oversight of seabirds and some marine mammal species by the USFWS</li> <li>Expansion and construction of boat harbors</li> <li>Expansion of state groundfish fisheries</li> <li>Other state actions</li> <li>Ongoing EPA monitoring of seafood processor effluent discharges</li> </ul>
Private actions	<ul style="list-style-type: none"> <li>Commercial fishing</li> <li>Increasing levels of economic activity in coastal zone off Alaska</li> <li>Expansion of aquaculture</li> </ul>

Reasonably foreseeable future actions for marine mammals and seabirds include ecosystem-sensitive management; rationalization; traditional management tools; actions by other Federal, state, and international agencies; and private actions, as described in Sections 8.4 and 9.3 of the Harvest Specifications EIS (NMFS 2007). Ecosystem-sensitive management, rationalization, and traditional management tools are likely to increase protection to marine mammals and seabirds by considering these species more in management decisions, and by improving the management and conservation of grenadiers through the restructured Observer Program, catch accounting, seabird avoidance measures, and vessel monitoring systems (VMS). Research into marine mammal and seabird interactions with the fisheries are likely to lead to an improved understanding leading to hook-and-line and trawling methods that reduce adverse impacts of the fisheries. Changes in the status of species listed under the ESA, the addition of new listed species or critical habitat, and results of future Section 7 consultations may require modifications to groundfish fishing practices to reduce the impacts of these fisheries on listed species and critical habitat. Any change in protection measures for marine mammals likely would not have significant effects because any changes would be unlikely to result in the PBR being exceeded and would not be likely to jeopardize the continued existence or adversely modify or destroy designated critical habitat.

Any action by other entities that may impact marine mammals and seabirds will likely be offset by additional protective measures for the Federal fisheries to ensure ESA-listed mammals and seabirds are not likely to experience jeopardy or adverse modification of critical habitat

Reasonably foreseeable future actions for habitat and the ecosystem include ecosystem-sensitive management; rationalization; traditional management tools; actions by other Federal, state, and international agencies; and private actions, as detailed in Sections 10.3 and 11.3 of the Harvest Specifications EIS (NMFS 2007). Ecosystem-sensitive management, rationalization, and traditional management tools are likely to increase protection to ecosystems and habitat by considering ecosystems and habitat more in management decisions and by improving the management of the fisheries through the Observer Program, catch accounting, seabird and marine mammal protection, gear restrictions, and VMS. Continued fishing under the harvest specifications is likely the most important cumulative effect on EFH but the EFH EIS (NMFS 2005) has determined that this effect is minimal. The Council is also considering improving the management of non-specified species incidental takes in the fisheries to provide more protection to this component of the ecosystem.

There is no new information available that suggests the effects of climate change combined with the effects of this action will have effects beyond those already discussed in the Alaska Groundfish Final Programmatic Supplemental EIS (NMFS 2004), and the Harvest Specifications EIS (NMFS 2007). Commercial fishing has not been largely implicated in the GOA ecosystem changes; however, studies of other ecosystems with much larger fishing pressures indicate that fishing, in combination with climate change, can alter ecosystem species composition and productivity (NMFS 2004). The cumulative effect of these impacts in combination with measures proposed under the alternatives considered are not likely to be significant.

At present there are no directed fisheries for grenadiers in the BSAI or GOA; grenadiers are taken as incidental catch in other directed commercial groundfish and Pacific halibut fisheries. Under several of the alternatives considered for the inclusion of grenadiers in the FMPs, a directed fishery for grenadiers could develop. Thus far a couple of test trips by vessels using trawl gear out of Kodiak to target giant grenadiers have taken place. While the fishing effort was considered successful (the total catch comprised approximately 80 percent grenadiers), there was no market for the product so directed fishing ceased (Wayne Tippler, fishing participant and vessel captain, personal communication, October 2005). In recent years up to 200 mt of giant grenadier, taken as incidental catch in other directed groundfish fisheries were retained for processing. Although giant grenadier are generally considered poor for human consumption due to the high water content of their flesh, there has been some food technology research to develop marketable products from giant grenadiers (Crapo, 1999 a and b).

A good case study for the development of a directed fishery would be arrowtooth and Kamchatka flounder in the BSAI and GOA. Fifteen years ago these flounders were considered to be trash fish. They were once used as a basis species for the retention of other more valuable groundfish like sablefish, rockfish, and Pacific cod; discarded at sea; or used for the production of fishmeal. After food technology research developed marketable products from arrowtooth and Kamchatka flounder, retention of flounders rose from 21 percent in 2004 to 88 percent in 2012, and total catch rose from 18,151 mt in 2004 to 32,370 mt in 2012.

Under Alternative 1, the no action alternative (status quo), grenadiers would continue as non-FMP species without any harvest limitations or recordkeeping and reporting requirements, and a directed fishery could develop with additional adverse impacts on several of the environmental elements analyzed.

Under Alternative 2, which would include grenadier in both the BSAI and GOA groundfish FMPs as target species "in the fishery," OFLs, ABCs, TACs, other management measures, and recordkeeping and reporting requirements would need to be established for grenadiers. A directed fishery could develop if the Council recommended a TAC above the amount needed for incidental catch in other fisheries.

Under Alternative 3, which would include grenadier in both the BSAI and GOA groundfish FMPs as an “ecosystem component,” OFLs, ABCs, and TACs, would not need to be established. However, other management measures could be, and recordkeeping and reporting requirements would need to be established for grenadiers. Present and past harvests of grenadiers have been taken incidentally in other directed fisheries. As an “ecosystem component” grenadiers would be closed to directed fishing and there would be no directed fishing targeting grenadiers. MRAs of grenadiers as an incidental catch species could be established limiting the development of a grenadier fishery.

Under Alternative 4, which would include grenadier in the BSAI groundfish FMP as an “ecosystem component” and in the GOA groundfish FMP as a designated target species group “in the fishery,” the effects would be the same as described under Alternative 3 in the BSAI and as under Alternative 2 in the GOA.

Considering the direct and indirect impacts of the proposed action when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference and the impacts of the reasonably foreseeable future actions listed above, the cumulative impacts of the proposed action are determined to be not significant.

### 3.12 Summary of Environmental Impacts

The table below summarizes the impacts of the alternatives considered on the environmental components analyzed.

**Table 3-11 Summary of the Environmental Impacts of the Alternatives Considered**

<b>Environmental Component</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>	<b>Alternative 4</b>	<b>Option 1 or 2</b>
<b>Grenadiers and Groundfish Targets</b>					
Stock Biomass	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)
Fishing Mortality	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)
Spatial or Temporal Distribution	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)
Change in Prey Availability	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)
<b>Ecosystem Component</b>					
Prohibited Species	No Impact	No Impact	No Impact	No Impact	No Impact
Forage Fish Species	No Impact	No Impact	No Impact	No Impact	No Impact
<b>Marine Mammals</b>					
Incidental Take and Entanglement	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)
Prey Availability	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)
Disturbance	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)
<b>Seabirds</b>					
Incidental Take	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)
Prey Availability	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)
Benthic Habitat	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)
<b>Essential Fish Habitat</b>					
Habitat Disturbance	No Impact	No Impact	No Impact	No Impact	No Impact
Habitat Damage	No Impact	No Impact	No Impact	No Impact	No Impact
Cumulative Impacts	None Identified	None Identified	None Identified	None Identified	None Identified
<b>Socioeconomic Impacts</b>	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)	Insignificant (+ or -)

## 4 Management and Enforcement Considerations

### 4.1 Alternative 1, The No Action Alternative

Under Alternative 1, the no action alternative or status quo, there are no management measures that would need to be established. There would be no catch limitations and recordkeeping or reporting requirements for grenadiers. Retained catch of grenadiers could be used as a basis species under “aggregated amount of non-groundfish species” in Tables 10 and 11 to CFR 50 part 679. Alternative 1 does not address the problem statement adopted by the Council in June 2012.

### 4.2 Management Options under Alternative 2, Include Grenadiers in the BSAI and GOA groundfish FMPs as Target Species “in the fishery”

Under Alternative 2 several management measures would need to be adopted.

**Record and Reporting Requirements.** The selection of Option 1 would require the reporting of giant grenadiers and other grenadiers only. These species codes already exist and Table 2a, FMP Species Codes, and Table 2d, Non-FMP Species Codes, to 50 CFR part 679 would be amended to reflect the inclusion of grenadiers in the FMPs. The selection of Option 2 would require the reporting of giant grenadier, popeye, Pacific, and other grenadiers. New species codes would need to be established for popeye and Pacific grenadiers and Table 2a, FMP Species Codes, and Table 2d, Non-FMP Species Codes, to 50 CFR part 679 would be amended to reflect the inclusion of grenadiers in the FMPs. NMFS would monitor the catch and disposition of the catch of grenadiers. Table 3 to part 679 would need to be amended to include product recovery rates (PRRs) for grenadiers. The most similar groundfish species, morphologically, in Table 3 is Pacific cod. The PRRs for Pacific cod could be used for grenadiers or unique PRRs could be established.

**Annual Harvest Specifications.** OFLs, ABCs, and TACs for grenadiers would be established as part of the annual groundfish harvest specifications process. Annual catch limits (ACLs), not to exceed and generally set equal to the ABC would be adopted. Accountability measures (AMs), in the event the ACL is exceeded would be adopted. The stock assessment authors have recommended that the management areas should be the BSAI and the GOA separately without further subdivision. The harvest specifications could be subdivided between the eastern Bering Sea and Aleutian Islands, but this is not recommended due to the variability of biomass estimates in the Aleutian Islands. Combining the Aleutian Islands biomass estimates with the eastern Bering Sea biomass estimates reduces the variability of the overall biomass estimate. There would be considerable flexibility in setting the TACs. TACs should be set minimally at a level anticipated to meet incidental catch needs in other directed fisheries. At this TAC level grenadiers would be closed to directed fishing (bycatch status only). Also, grenadier would have the least impact on other groundfish TACs in the BSAI which has OY cap of 2 million mt. TACs could be set at higher levels than incidental catch needs, which would allow for a directed fishery targeting grenadiers. At present, incidental catch meets the industry need for experimental processing, and marketing of grenadiers and is well below ABC recommendations (Section 3.2.3).

**Maximum Retainable Amounts (MRAs) of Incidental Catch.** Table 10, GOA Retainable Percentages, and Table 11, BSAI Retainable Percentages, to 50 CFR part 679 would be amended to include MRAs for grenadiers both as a basis species, when open to directed fishing, and as an incidental catch species, when closed to directed fishing but retention is not prohibited. For MRAs, there is considerable flexibility. Unique MRAs could be established for grenadier MRAs. Alternatively, as an incidental catch species,

grenadiers could be included in an existing species group. For example, to preserve the status quo grenadiers could be included with aggregated non-groundfish species when used as a basis species and included with an incidental catch species group when closed to directed fishing but retention is not prohibited. MRAs for the incidental catch of groundfish range from zero to 35 percent, with the most common rate of 20 percent. In establishing MRAs the Council should consider measures for the fishery to minimize incidental catch and mortality of grenadiers to the extent practicable consistent with National Standard 9 to protect their role in the ecosystem, and to minimize regulatory discards.

***Prohibited Species Catch (PSC) limits for Grenadiers.*** PSC limits could be established for the grenadier fishery specifically or grenadiers could be included in an existing PSC limit fishery category. In the BSAI grenadiers could be included in the trawl Greenland turbot/arrowtooth flounder/Kamchatka flounder/sablefish fishery category and for other gear types in the non-trawl fisheries. In the GOA grenadiers could be included in the trawl deep-water species fishery and in the other hook-and-line fisheries category.

***Establish Open Seasons for Grenadiers.*** Specific open seasons could be established for the grenadier directed fishery or grenadiers could be included in one of the existing seasons. For example grenadiers could be included in the general directed fishery opening for hook-and-line gear (January 1) and for trawl gear (January 20), concurrent with individual fishing quota (IFQ) season dates, which may vary annually, or in the BSAI with the opening dates (May 1) for the Greenland turbot/arrowtooth flounder/Kamchatka flounder fisheries.

#### **4.3 Management Options under Alternative 3, Include Grenadiers in the BSAI and GOA groundfish FMPs as “Ecosystem Component” Species**

Under Alternative 3 several management measures would need to be adopted while other management measures could be, but need not be, adopted.

***Record and Reporting Requirements.*** The selection of Option 1 would require the reporting of giant grenadiers and other grenadiers. Species codes already exist and Table 2a, FMP Species Codes, and Table 2d, Non-FMP Species Codes, to 50 CFR part 679 would be amended to reflect the inclusion of grenadiers in the FMPs. The selection of Option 2 would require the reporting of giant grenadier, popeye, Pacific, and other grenadiers. New species codes would need to be established for popeye and Pacific grenadiers and Table 2a, FMP Species Codes, and Table 2d, Non-FMP Species Codes, to 50 CFR part 679 would be amended to reflect the inclusion of grenadiers in the FMPs. NMFS would monitor the catch and disposition of the catch of grenadiers. Table 3 to part 679 would need to be amended to include PRRs for grenadiers. The most similar groundfish species, morphologically, in Table 3 is Pacific cod. The PRRs for Pacific cod could be used for grenadiers or unique PRRs could be established.

***Annual Harvest Specifications.*** OFLs, ABCs, and TACs for grenadiers would not need to be established. Grenadiers would be closed to directed fishing year round and catches of grenadiers would not accrue towards the OY caps in the BSAI and GOA. However, the stock assessment authors have recommended that the Council establish an allowable incidental catch (AIC) threshold for “ecosystem component” (EC) stocks based on current methods to determine OFL. Should the AIC for an EC stock be exceeded more than once in a 4-year period there would be a mandatory review of the stock’s status by the Council’s Groundfish Plan Teams and SSC, with the possibility of reclassification of that stock as in the fishery if warranted. The stock assessment authors believe this approach would ensure that the EC classification does not result in uncontrolled incidental catches of EC stocks. Alternatively, for greater protection of grenadiers, the AIC could be set equal to or lower than ABC levels. EC species do not require specification of reference points but should be monitored as new, pertinent scientific information

becomes available to determine changes in their status or their vulnerability to the fishery. Should it become necessary, they should be reclassified as “in the fishery.”

***Maximum Retainable Amounts (MRAs) of Incidental Catch.*** Table 10, GOA Retainable Percentages, and Table 11, BSAI Retainable Percentages, to 50 CFR part 679 could be amended to include MRAs for grenadiers as an incidental catch species. Since grenadiers would be closed to directed fishing as EC species they could not be used as a basis species for the retention of other groundfish. Unique MRAs could be established for grenadiers. MRAs for the incidental catch of groundfish range from zero to 35 percent, with the most common rate of 20 percent. Alternatively, as an incidental catch species, grenadiers could be included in an existing species group. For example, grenadiers could be included with the “other species” group (sharks, skates, sculpins, and octopus in the aggregate in the BSAI and sharks, sculpins, squid, and octopus in the aggregate in the GOA) as an incidental catch species group. While EC species are not considered to be “in the fishery,” the Council should consider measures for the fishery to minimize incidental catch and mortality of EC species consistent with National Standard 9, to protect their role in the ecosystem and to minimize regulatory discards.

***Prohibited Species Catch (PSC) limits for Grenadiers.*** PSC limits would not need to be established for grenadiers as they would be closed to directed fishing.

***Establish Open Seasons for the Grenadiers.*** Open directed fishing seasons would not need to be established for grenadiers as they would be closed to directed fishing.

#### **4.4 Management Options under Alternative 4, Include Grenadiers in the BSAI Groundfish FMP as “Ecosystem Component” Species and in the GOA Groundfish FMP as “in the Fishery” Target Species**

Alternative 4 would need to adopt the management measures required under Alternative 3 outlined above for grenadiers in the BSAI and would need to adopt the management measures required under Alternative 2 outlined above for grenadiers in the GOA. This alternative would not impact the TACs of other groundfish targets in the BSAI, which is constrained by the OY cap of 2 million mt. In the GOA where the OY cap is well above the sum of groundfish TACs, this is not a consideration.

#### **4.5 Enforcement Considerations**

The NMFS Office of Law Enforcement has no additional concerns with the enforcement of the provisions considered under any of the alternatives.

#### **4.6 Summary of Management Measures for Grenadiers**

The following tables summarize the management measures that would need to be adopted and those management measures that could but need not be adopted under Alternatives 1 through 4.

**Table 4-1 Management measures that would need to be adopted under Alternatives 1 through 4**

Alternative	Action Required
1. Status Quo. No Action	<p>None.</p> <ol style="list-style-type: none"> <li>1. No recordkeeping, reporting, and monitoring requirements.</li> <li>2. No annual harvest specifications would be required.</li> <li>3. PRRs would not be required.</li> <li>4. Existing MRAs for groundfish using grenadiers as a basis species would continue.</li> <li>5. No PSC limits would apply.</li> <li>6. No closed season to directed fishing.</li> <li>7. Exempt from observer coverage requirements.</li> </ol>
2. Include Grenadiers in the BSAI and GOA FMPs as "in the fishery"	<p>FMP amendments and regulatory additions to establish management measures</p> <ol style="list-style-type: none"> <li>1. Recordkeeping and reporting would be required and NMFS would monitor the catch and disposition of catch.</li> <li>2. Annual harvest specifications would be specified (OFLs, ABCs, TACs along with ACLs and AMs)</li> <li>3. PRRs would need to be established in regulation.</li> <li>4. MRAs using grenadiers as a basis species and the MRA of grenadiers as an incidental catch species would need to be established in regulation.</li> <li>5. PSC limits for the grenadier fishery would need to be established in regulation.</li> <li>6. Open seasons for directed fishing would need to be established in regulation.</li> </ol>
3. Include Grenadiers in the BSAI and GOA FMPs as "ecosystem component" species	<p>FMP amendments and regulatory additions to establish management measures</p> <ol style="list-style-type: none"> <li>1. Recordkeeping and reporting would be required and NMFS would monitor the catch and disposition of catch.</li> <li>2. Annual harvest specifications would not be specified (OFLs, ABCs, TACs along with ACLs and AMs). However, an AIC limit could be established which if reached could trigger PSC status.</li> <li>3. PRRs would need to be established in regulation.</li> <li>4. MRAs using grenadiers as a basis species would not be established. An MRA of grenadiers as an incidental catch species would need to be established in regulation.</li> <li>5. PSC limits for the grenadier fishery would not need to be established in regulation.</li> <li>6. Open seasons for directed fishing would not need to be established in regulation as grenadiers would be closed to directed fishing year round.</li> </ol>
4. Include Grenadiers in the BSAI FMP as an "ecosystem component" and in GOA FMP as "in the fishery"	<p>FMP amendments and regulatory additions to establish management measures</p> <p>In the BSAI those actions listed under Alternative 3 would need to be undertaken while in the GOA those actions listed under Alternative 2 would need to be undertaken.</p>

**Table 4-2 Summary of management options under Alternative 2, include grenadiers in FMPs as target species “in the fishery”**

Action Required	Management Options
1. Recordkeeping and reporting would be required and NMFS would monitor the catch and disposition of catch.	Which species should be included for recordkeeping and reporting. Option 1. Giant grenadier and other grenadiers. Option 2. Giant, popeye, Pacific, and other grenadiers.
2. Annual harvest specifications would be specified (OFLs, ABCs, TACs along with ACLs and AMs).	Management Area A) BSAI and GOA without further subdivision. B) Bering Sea, Aleutian Islands, and GOA without further subdivision. Annual harvest specifications Option 1. Giant grenadiers. Option 2. Giant, popeye, and Pacific grenadiers with giant grenadiers as a proxy for the group.
3. PRRs would need to be established in regulation.	A) Establish a species specific PRR for grenadiers. B) Use existing Pacific cod PRRs for grenadiers.
4. MRAs using grenadiers as a basis species and the MRA of grenadiers as an incidental catch species would need to be established in regulation.	As a Basis Species A) Establish unique MRAs for grenadiers. Current MRAs range from 0 to 35%, with the most common rate of 20%. B) Status quo. Same as aggregated amount of non-groundfish species. As an Incidental Catch Species A) Establish specific MRAs for grenadiers B) Include grenadiers with the “other species” group in the aggregate.
5. PSC limits for the grenadier fishery would need to be established in regulation.	Trawl Fisheries A) Establish grenadier specific PSC limits in the BSAI and GOA. B) Include grenadiers with Greenland turbot/arrowtooth/sablefish fisheries in the BSAI and the deep-water species in the GOA. Hook-and-Line and Non-Trawl Fisheries A) Establish grenadier specific PSC limits in the BSAI and GOA. B) Include grenadiers with other hook-and-line fisheries in the GOA and the non-trawl fisheries in the BSAI.
6. Open seasons for directed fishing would need to be established in regulation.	A) Include grenadiers with general opening for hook-and-line (January 1) and trawl (January 20). B) Concurrent with the IFQ season. Suboption for the BSAI C) Concurrent with the Greenland turbot, arrowtooth and Kamchatka flounder fisheries (May 1).

**Table 4-3 Summary of management options under Alternative 3, include grenadiers in FMPs as “ecosystem component” (EC) species**

Action Required	Management Options
1. Recordkeeping and reporting would be required and NMFS would monitor the catch and disposition of catch.	Which species should be included for recordkeeping and reporting. Option 1. Giant grenadier and other grenadiers. Option 2. Giant, popeye, Pacific, and other grenadiers.
2. Annual harvest specifications would be specified (OFLs, ABCs, TACs along with ACLs and AMs)	Not required. However an AIC could be established and monitored which if reached could trigger PSC status based on A) Recommended OFL for grenadiers. B) Recommend ABC for grenadiers C) Anticipated incidental catch needs.
3. PRRs would need to be established in regulation.	Not required.
4. MRAs using grenadiers as a basis species and the MRA of grenadiers as an incidental catch species would need to be established in regulation.	As a Basis Species Not required, as EC species grenadiers would be closed to directed fishing year round. As an Incidental Catch Species A) Establish specific MRAs for grenadiers B) Include grenadiers with other species in the aggregate.
5. PSC limits for the grenadier fishery would need to be established in regulation.	Not required, as an EC species grenadiers would be closed to directed fishing year round.
6. Open seasons for directed fishing would need to be established in regulation.	Not required, as EC species grenadiers would be closed to directed fishing year round.

## 5 Regulatory Impact Review and Probable Economic and Socioeconomic Impacts

### 5.1 Introduction

This Regulatory Impact Review (RIR) evaluates the costs and benefits of four alternatives for the inclusion of several species of grenadiers (giant, Pacific, and popeye grenadier) in the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI groundfish FMP) and the Fishery Management Plan for Groundfish of the Gulf of Alaska (GOA groundfish FMP). This would be achieved by including grenadiers in the FMPs as being either “in the fishery” or as an “ecosystem component” and adopting management measures designed to improve the protection, conservation, and catch and disposition accounting of grenadiers. There are also two options which would specify the grenadier species to be included in any of the action alternatives.

### 5.2 What is a Regulatory Impact Review

This RIR is required under Presidential Executive Order 12866 (58 FR 51735, September 30, 1993). The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following statement from the order:

*In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.*

E.O. 12866 further requires that the Office of Management and Budget review proposed regulatory programs that are considered to be “significant.” A significant regulatory action is one that is likely to—

- Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

Raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in this Executive Order.

### 5.3 Statutory Authority

Under the Magnuson-Stevens Act, the United States has exclusive fishery management authority over all marine fishery resources found within the exclusive economic zone (EEZ). The management of these marine resources is vested in the Secretary of Commerce and in the regional fishery management councils. The potentially affected groundfish fisheries in the Bering Sea and Aleutian Islands EEZ and

the GOA EEZ are managed under the BSAI groundfish FMP and the GOA groundfish FMP. The Council prepared the FMPs, and the Secretary of Commerce approved them, under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801, *et seq.*). Regulations implementing the FMPs are contained in 50 CFR part 679. General regulations that also pertain to U.S. fisheries appear at subpart H of 50 CFR part 600.

## 5.4 Purpose and Need for Action

Grenadiers are not presently included in, or managed under, the BSAI groundfish FMP or GOA groundfish FMP. There are no limits on their catch or retention, no reporting requirements, and no official record of their catch. However, grenadiers are taken in relatively large amounts as bycatch, especially in hook-and-line fisheries; no other Alaskan groundfish has such high catches that is not included in the FMPs. Grenadiers in Alaska are unique in that this is the only non-FMP species group for which a stock assessment, using Tier 5 calculations, has been prepared. The stock assessment uses giant grenadier as a proxy for the species group. The proposed action is needed to provide formalized structure for grenadier management in the BSAI and GOA EEZs.

The purpose of the proposed action is to improve the reporting and catch accounting of grenadiers in order to provide additional protection for grenadiers from the potential adverse effects of groundfish fisheries off Alaska. This action is necessary to amend the FMPs to include grenadiers, thereby allowing the adoption of management measures and catch accounting requirements. The giant grenadier are nearly all (more than 99 percent) discarded, and discard mortality is 100 percent because none of the fish survive when brought to the surface. With inclusion of grenadier in the FMPs, reporting of catches would be mandatory and more accurate than the present catch estimates that are based exclusively on observer data. Inclusion in the FMPs would also serve to address the problem of grenadier bycatch and discard waste in a formalized manner.

## 5.5 Background

### 5.5.1 Grenadiers

At present, there is no directed fishery for grenadiers in the waters off Alaska. However, grenadiers are taken incidentally in several fisheries. Historically, grenadier catch in the federally managed fishery off Alaska has occurred in groundfish hook-and-line sector (Clausen and Gaichas 2005). In the Aleutian Islands, most grenadier catch has historically been taken in the sablefish hook-and-line fishery, while in the Bering Sea the majority came from the Greenland turbot hook-and-line fishery. In recent years, however, many sablefish and Greenland turbot fishermen in the BSAI have switched to using pots to protect their catches from whale depredation. In 2011, 60 percent of the fixed-gear eastern Bering Sea catch of sablefish was taken in pots (Hanselman et al. 2011), and it is uncertain how this change has affected grenadier catches in this area. However, analysis of sablefish pot catches in the BSAI indicates that giant grenadier is the fourth most abundant bycatch species (Hanselman et al. 2009).

From 1997 to 2012, catches<sup>6</sup> of grenadiers in the eastern Bering Sea have ranged from 1,631 to 5,011 mt (average 2,948 mt annually); similarly, catches in the Aleutian Islands have ranged from 1,251 to 4,383 mt (average 2,626 mt annually). Catches in the eastern Bering Sea and Aleutian Islands combined have averaged 5.574 mt annually from 1997 through 2012. There were also large catches of grenadiers in the “other flatfish” fishery in the Aleutian Islands since 2009. Within the “other flatfish” target category, the most common target fishery that caught grenadiers were the arrowtooth and Kamchatka flounder trawl fisheries.

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<sup>6</sup> Annual catches from 1997 through 2012 are presented in Table 3-4. of the Environmental Assessment.

Catches in the BSAI are consistently lower than catches in the GOA, which range from 5,419 to 14,863 mt, and average 9,838 mt (Table 3.3 above). An analysis of catch estimates for 1997 to 1999 indicated that most of the grenadier catch in the GOA was taken in the sablefish fishery (Table 3.3 above). Catches of grenadiers in the “other flatfish” fisheries in the GOA were less substantial and were found in the arrowtooth flounder and rex sole trawl fisheries (Rodgveller and Clausen 2012). Nearly all the grenadier catch is discarded, and the discard mortality rate is 100 percent because the pressure difference experienced by the fish when they are brought to the surface invariably causes death.

Because of the large biomass of giant grenadier on the continental slope, research has been done to develop marketable products from this species (Crapo et al. 1999a and 1999b). There have been several known attempts to develop a fishery in Alaska. The first was an endeavor to process hook-and-line-caught giant grenadier for surimi at the port of Kodiak in 1998.<sup>7</sup> This small effort was apparently unsuccessful, as it ended in 1999. The second, also from the port of Kodiak, was an exploratory effort in 2005 using trawls to target giant grenadier and develop a fillet and roe market.<sup>8</sup> This second venture was not continued in 2006. From 2009 to 2011 approximately 1,400 mt of incidentally caught grenadier were retained for processing.<sup>9</sup> Personal communications with the industry indicate that at least some of this catch was sold as headed and gutted and tail cut off; however, giant grenadiers have little or no value at present.

## 5.5.2 Groundfish Management

The proposed action alternatives being considered would apply to all BSAI and GOA Federal groundfish fisheries inclusive of all gear types used to harvest groundfish. As has been mentioned above, grenadier incidental catch has historically occurred primarily in the hook-and-line gear class; however, the pot gear and trawl gear sectors also contribute to the incidental catch of grenadiers. Each of these fishing sectors is thoroughly described in “Fishing Fleet Profiles,” prepared by Council staff in April of 2012 (NPFMC 2012c), which is incorporated by reference here.

The potential impacts of the proposed actions will depend largely on decisions made by the Council in future annual catch specifications processes. In the BSAI, the combined total of all total allowable catch (TAC) cannot exceed 2.0 million mt annually; however, there is no similar constraint in the GOA. Thus, any alternative that requires the Council to set a grenadier TAC in the BSAI will require reduction in the TAC of some other species to “fund” the grenadier TAC such that the cumulative total TAC remains under 2.0 million mt. In contrast, a grenadier TAC in the GOA can be set without impact on other TAC specifications.

The annual TAC specifications process is quite complex. This process involves assessment authors developing and presenting stock models to the Council’s Groundfish Plan Teams in September. The assessments and models are also reviewed by the Council’s SSC and there are further Groundfish Plan Team reviews in November. The Council’s SSC provides a final review in December, including recommendation of TAC ranges by species. Ultimately, the Council reviews the SSC recommendations, along with recommendations from the Council’s Advisory Panel and chooses TAC levels for each species based on this input as well as input from the public. Clearly, it is not possible to predict future outcomes

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<sup>7</sup> J. Ferdinand, National Marine Fisheries Service, Alaska Fisheries Science Center, REFM Division, 7600 Sand Point Way NE, Seattle WA 98115-0070. Personal communication, September 2004.

<sup>8</sup> T. Pearson, Kodiak Fisheries Research Center, National Marine Fisheries Service, Sustainable Fisheries, 302 Trident Way, Room 212, Kodiak AK 99615. Personal communication, October 2005.

<sup>9</sup> J. Keaton, National Marine Fisheries Service, Regional Office, P.O. Box 21668, 709 W. 9<sup>th</sup> St., Juneau, AK, 99802-1668, Personal communication, October 2012.

of this process, as they depend on biologic and socioeconomic conditions as well as a thorough public process. Thus, it is not possible to quantify the potential impacts that setting a grenadier TAC in the BSAI may have as those impacts will be determined in future annual TAC setting processes.

## 5.6 Alternatives

The alternatives and options evaluated in this analysis were adopted by the Council in June 2012. The management and enforcement actions needed to implement each of the alternatives are discussed in Section 4.

### ***Alternative 1:*** No action (Status Quo).

This alternative would require no additional management measures. At present grenadiers are not included in the FMPs. There are no closed seasons (where directed fishing is prohibited), catch limits, or retention limits for grenadiers and unlimited amounts may be taken. There are no reporting or recordkeeping requirements for grenadiers, and currently the best estimate of catch comes from observer data. Vessels which have a Federal Fisheries Permit may use their retention of grenadiers as basis species for the retention of other groundfish up to the maximum amounts listed in Tables 10 and 11 to 50 CFR part 679, for the GOA and BSAI.

### ***Alternative 2:*** Include Grenadiers in the BSAI and GOA FMPs as “in the fishery.” This alternative would include grenadiers “in the fisheries” as targeted species.

Stocks of fish that are “in the fishery” are those stocks that are targeted, harvested, and retained for sale or personal use; stocks that are not directly targeted but are taken incidentally in other directed fisheries and are retained for sale or personal use; and stocks neither targeted nor retained but are taken as incidental catch and for which overfishing or overfished status may be a concern. For each of those stocks, whether a single species or species group, overfishing levels (OFLs), acceptable biological catch (ABCs), and TACs must be established each year in the annual harvest specifications process, as well as annual catch limits (ACLs) and accountability measures (AMs). In order for separate species to be aggregated together and managed as a species group (sometimes called a species complex), the species should have a similar geographic distribution, life history, and vulnerability. Recordkeeping and reporting of grenadier catch would be required and other management measures discussed in Section 4 would need to be adopted.

Alternative 2 has been recommended by the Alaska Fisheries Science Center (AFSC) staff and the BSAI and GOA Groundfish Plan Teams.

### ***Alternative 3:*** Include Grenadiers in the BSAI and GOA FMPs as an “ecosystem component.”

In order to be designated as an “ecosystem component” (EC) the species or species group should be a non-targeted species or species group; not subject to overfishing, overfished, or approaching an overfished condition based on the best available information in the absence of conservation and management measures; and not generally retained (a small amount could be retained) for sale or commercial use. The catch of EC species would be required to be reported for monitoring purposes and directed fishing (open status) for EC species would be prohibited. However, maximum retainable amounts of incidental catch and other management measures could be adopted for EC species. Species may be included in the FMP as an EC for any of the following reasons: for data collection and catch monitoring purposes; for ecosystem considerations related to specification of optimum yield (OY) for the associated fishery; as considerations in the development of conservation and management measures for the associated fishery; or to address other ecosystem concerns. While EC species are not considered to be

“in the fishery,” the Council should consider measures for the fishery to minimize incidental catch and mortality of EC species consistent with National Standard 9, and to protect their role in the ecosystem. EC species do not require specification of reference points but should be monitored as new pertinent scientific information becomes available to determine changes in their status or their vulnerability to the fishery. Should it become necessary, they should be reclassified as target species “in the fishery.”

**Alternative 4:** Include Grenadiers in the BSAI FMP as an “ecosystem component” and in the GOA FMP as “in the fishery.”

This alternative is offered as a “compromise” between the alternatives outlined above. There are good scientific and rational arguments for categorizing grenadiers as “in the fishery” in both the GOA and the BSAI. However, classifying grenadiers as “in the fishery” in the BSAI may impact the manner in which the cumulative TACs of each target species and target species groups are set so as not to exceed the overall OY cap of 2.0 million mt in the BSAI. Presumably the TAC for grenadiers would be set at a maximum amount not to exceed the ABC and minimally at an amount necessary to meet incidental catch needs in other directed groundfish fisheries. The TACs other, more valuable groundfish targets would have to be slightly lowered in those years when the maximum OY cap of 2.0 million mt can be taken. A possible solution to this problem would be to categorize grenadiers as “in the fishery” in the GOA and as an “ecosystem component” in the BSAI. Placing grenadiers in the “ecosystem component” category in the BSAI would mean that their catches would not count toward the OY cap of 2.0 million mt and would not affect the TACs of other groundfish in this area. An “ecosystem component” classification for grenadiers in the BSAI may be acceptable from a biological and management standpoint because giant grenadiers are very abundant in this area, whereas catches have been relatively small. Thus, overfishing of grenadiers in the BSAI is unlikely in the foreseeable future. In contrast, there is more of a need to categorize grenadiers in the GOA as “in the fishery” because giant grenadier in this area are not as abundant and their catches have been consistently larger than in the BSAI. Categorizing grenadiers in the GOA as “in the fishery” would help ensure that overfishing of giant grenadier in this area would not occur.

The options for grenadier species to be included (applicable to any of the action alternatives) are:

**Option 1.** giant grenadier only

Giant grenadier are by far the most common grenadier caught in the fisheries and surveys in Alaska and are used as a proxy for the entire grenadier complex in the grenadier assessment. The assessments are based on Tier 5 calculations where  $OFL = B$  (biomass)  $\times M$  (natural mortality rate) and  $ABC = OFL \times 0.75$ .

**Option 2.** giant, popeye, and Pacific grenadiers

Popeye and Pacific grenadiers do not commonly occur in the surveys and are seldom caught in the commercial fisheries because they inhabit depths greater than where the commercial fisheries occur and at depths infrequently sampled by the surveys. The OFL and ABC would continue to be based on  $B$  and  $M$  estimates for giant grenadiers only as a proxy for the grenadier complex. The immediate advantage of this option would be to improve the catch and disposition estimates and reporting of popeye and Pacific grenadier.

## 5.7 Potential Effects of the Alternatives

Under Alternative 1, the no action alternative, grenadiers would continue as non-FMP species without any harvest limitations or recordkeeping and reporting requirements. Since the present and past harvests of grenadiers taken incidentally are well below the current ABCs calculated for grenadiers, there would be no significant effects (either adverse or beneficial) on the stock biomass, fishing mortality, spatial or temporal distribution, or changes in prey availability for grenadier and groundfish target species in either the BSAI or GOA. Thus, there would be no significant change in groundfish harvesting operations and no significant changes in the socioeconomic conditions in the fishery.

Under Alternative 2, which would include grenadier in both the BSAI and GOA groundfish FMPs as target species “in the fishery,” OFLs, ABCs, TACs, other management measures, and recordkeeping and reporting requirements would need to be established for grenadiers. Since the present and past harvests of grenadiers taken incidentally are well below the current ABCs calculated for grenadiers, there would be no significant effects (either adverse or beneficial) on the stock biomass, fishing mortality, spatial or temporal distribution, or changes in prey availability for grenadier and groundfish target species in either the BSAI or GOA.

In the BSAI establishing a TAC for grenadiers at the ABC or incidental catch level could reduce the TAC levels for other, more valuable species. However, the amount of reduction in TAC that may occur in other groundfish target fisheries with grenadiers “in the fishery” in the BSAI are unknown. Each year, the annual stock assessments are prepared and revised over the course of two Groundfish Plan Team meetings and then presented, along with TAC range recommendations, to the Council in December. It is in that TAC setting process that changes in TAC levels are proposed and revisions to the TAC specifications are made in order to not exceed the overall maximum of 2.0 million mt in the BSAI. Thus, it is not possible to estimate what proportion of grenadier TAC would be specified from each of the other target fisheries in the BSAI. However, to put the potential impacts in perspective, consider that if the grenadier TAC in the BSAI were set at, for example, the estimated mean incidental catch level of 6,495 mt, the cumulative TACs for other groundfish species would be reduced by as little as 0.32 percent.

It is also possible to consider what the potential impacts would be were the grenadier TAC removed entirely from one species group. Table 5.1 compares the TAC levels and value with potential reductions in value, by species groups, using the example of a grenadier TAC set at 6,495 mt. The table provides the potential impacts in terms of the percent of total value within the species group if all of the grenadier TAC were taken from that species group, as well as the percent of BSAI total fishery value. These examples use the 2011 TAC levels and economic value data of the average, across gear and vessel types, round weight equivalent first wholesale value of all products produced from a metric ton of the species within the group.

Reductions in potential value range from just over \$69 million if all TAC reductions could occur in the sablefish fishery, to just under \$3 million in the other species group. Note, however, that sablefish is the smallest volume and highest valued species in the BSAI. It is not likely that TAC of a highly valued species would be reduced to “fund” a grenadier directed fishery having little or no value at present. Further, the volume of the sablefish fishery is not sufficient to “fund” a grenadier fishery so some other reduction in BSAI TAC would have to occur. It is more likely that the TAC reductions would come from the lowest valued species, which are in the other species group. The potential impacts in the other species group of \$3 million represent about 29 percent of the total value of that group. However, in comparison to the total value of the BSAI fishery, in terms of round weight equivalent first wholesale value, the reduction of the other species TAC to “fund” a grenadier TAC would reduce BSAI total revenue by thirteen hundredths of a percent. The overall impact in the other target fisheries, by species, range from half a percent in the rockfish fishery down to about a fifth of a percent in the flatfish fishery. These small

overall impact numbers are largely due to the vast majority of total BSAI fishery value coming from the BSAI pollock fishery. However, even if all of the grenadier TAC were taken from the pollock TAC, the impact on pollock fishery value would be a reduction of \$7.6 million, which is about one half of a percent of pollock fishery total value and about a third of a percent of the BSAI total value.

A further consideration is the fact that the 2 million mt TAC cap in the BSAI is not always reached. For example, in the period from 2008 through 2010, BSAI pollock TACs decreased considerably. Reduced BSAI pollock TAC resulted in adoption of BSAI groundfish TACs totaling 1,838,354 mt, 1,681,586 mt, and 1,677,154 mt, in 2008, 2009, and 2010, respectively (see groundfish harvest specification tables at <http://alaskafisheries.noaa.gov/sustainablefisheries/>). With average annual grenadier catch of approximately 6,500 mt, there would have been considerably more groundfish tonnages available under the 2 million mt cap to fund this level of grenadier catch in these years without affecting TACs for any other BSAI groundfish species. In addition, total TAC in 2004 fell 4,232 mt below the cap. Thus, in four of the past ten years, grenadier catch in the BSAI could have been “funded” with either no reduction in the TACs of other BSAI groundfish species, or with less than two tenths of a percent reduction in other TACs. Thus, were future variability in groundfish stocks to result in total BSAI TACs significantly lower than 2 million mt tons then, were a market for grenadier products to develop, retention of incidental catch and/or directed fishing of grenadier in the BSAI could improve optimal yield from the BSAI fishery in times of decreased stock abundance of other groundfish species. Thus, placing grenadiers “in the fishery” in the BSAI may offer the potential for improved future benefits to the nation.

It is important to recognize that these hypothetical impacts would be spread across all Federal groundfish participants, including BSAI Community Development Quota (CDQ) entities, via the allocations made to sectors in the TAC specifications process. Thus, the impacts of funding a grenadier TAC would be borne by all harvesting platforms in an affected sector and gear type, further ameliorating potential impacts. These hypothetical examples show that the likely potential economic impacts of having grenadiers “in the fishery” in the BSAI are not significant in comparison to the overall value of the BSAI groundfish fishery.

**Table 5.1 BSAI hypothetical impacts of grenadiers being put “in the fishery”: impact of all grenadier TAC (equal to average catch, 6,495 mt) being taken from a single species group based on 2011 TAC, and round weight equivalent first wholesale value.**

Species or Species Group	TAC	\$ per metric ton	Potential Value (\$ millions)	Potential Reduction in Value (\$ millions)	Percent of Potential Value	Percent of BSAI Total Value
Pollock	1,271,150	\$1,170	\$1,487	\$7.6	0.51%	0.33%
Pacific cod	227,950	\$1,392	\$317	\$9.0	2.85%	0.39%
Sablefish	4,750	\$10,672	\$51	\$69.3	136.74%	3.03%
Atka mackerel	53,080	\$1,484	\$79	\$9.6	12.24%	0.42%
Flatfish	390,198	\$749	\$292	\$4.9	1.66%	0.21%
Rockfish	30,547	\$1,757	\$54	\$11.4	21.26%	0.50%
Other Species	22,325	\$442	\$10	\$2.9	29.09%	0.13%
<b>Total</b>	<b>2,000,000</b>		<b>\$2,289</b>			

Sources: NMFS Alaska Region catch accounting system data and the 2012 Economic Status of Groundfish Stocks off Alaska (AFSC, 2012)

Under Alternative 3, which would include grenadier in both the BSAI and GOA groundfish FMPs as an “ecosystem component,” OFLs, ABCs, and TACs, would not need to be established. However, other management measures could be, and recordkeeping and reporting requirements would need to be established for grenadiers. Since the present and past harvests of grenadiers taken incidentally are well below the current ABCs calculated for grenadiers, there would be no significant effects (either adverse or beneficial) on the stock biomass, fishing mortality, spatial or temporal distribution, or changes in prey availability for grenadier and groundfish target species in either the BSAI or GOA. There would be no significant (either beneficial or adverse) socioeconomic effects on grenadiers or other groundfish targets in either the BSAI or GOA.

Under Alternative 4, which would include grenadier in the BSAI groundfish FMP as an “ecosystem component” and in the GOA groundfish FMP as a designated target species group “in the fishery,” the effects would be the same as described under Alternative 3 in the BSAI and as under Alternative 2 in the GOA. Since the present and past harvests of grenadiers taken incidentally are well below the current ABCs calculated for grenadiers, there would be no significant effects (either adverse or beneficial) on the stock biomass, fishing mortality, spatial or temporal distribution, or changes in prey availability for grenadier and groundfish target species in either the BSAI or GOA. There would be no significant (either beneficial or adverse) socioeconomic effects on grenadiers or other groundfish targets in either the BSAI or GOA.

It is true that Alternatives 2, 3, and 4 will impose new recordkeeping and reporting requirements on industry as well as additional fisheries management processes; however, given the small relative amount of grenadier catch these reporting requirements will have de-minimus effects on fishery participants. Similarly, grenadier stock assessments are presently being conducted and the additional burden on NMFS of new grenadier management measures will have de-minimus impacts.

## **5.8 Effects on Net Benefits to the Nation**

Net benefits to the Nation will not increase, in the short run, under Alternative 2 relative to the status quo. This is because of the need to reduce TAC of some species in the BSAI in order to add grenadier TAC to the annual specifications, which may decrease revenue unless a market for grenadier can be established. However, as a result of protecting the biomass, establishing grenadier TAC in the BSAI and GOA may lead to greater gross revenues from a sustainable fishery in the longer term. While grenadier has not proven to be easily marketable to date, there have been efforts to develop a market for this species. If a viable market should develop having grenadier “in the fishery” and managed for sustainability may enhance the long term total revenue of both the BSAI and GOA groundfish fisheries. This is especially true given the large biomass of grenadier, and the fact that TAC levels of other species can vary considerably from year to year thereby affecting fishery total revenue.

Net benefits are not expected to decrease under Alternatives 3 and 4, relative to Alternatives 1 and 2. Alternatives 3 and 4 do not affect fishery revenue, as there is no effect on TAC in the BSAI, and no TAC cumulative limit presently in the GOA. These alternatives provide enhancements to species monitoring and management that, while not quantifiable, are considered to be beneficial.

## 6 Initial Regulatory Flexibility Analysis

### 6.1 Introduction: The Purpose of an IRFA

This initial regulatory flexibility analysis (IRFA) evaluates the impacts on directly regulated small entities of the proposed action to include grenadiers in the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI groundfish FMP) and the Fishery Management Plan for Groundfish of the Gulf of Alaska (GOA groundfish FMP). This IRFA addresses the statutory requirements of the Regulatory Flexibility Act (RFA) of 1980, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (5 U.S.C. 601-612).

The RFA, first enacted in 1980, was designed to place the burden on the government to review all regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or nonprofit organization frequently has a bearing on its ability to comply with a Federal regulation. Major goals of the RFA are 1) to increase agency awareness and understanding of the impact of their regulations on small business, 2) to require that agencies communicate and explain their findings to the public, and 3) to encourage agencies to use flexibility and to provide regulatory relief to small entities.

The RFA emphasizes predicting significant adverse economic impacts on small entities as a group distinct from other entities, and on the consideration of alternatives that may minimize adverse economic impacts, while still achieving the stated objective of the action. When an agency publishes a proposed rule, it must either “certify” that the action will not have a significant adverse economic impact on a substantial number of small entities, and support that certification with the “factual basis” upon which the decision is based; or it must prepare and make available for public review an IRFA. When an agency publishes a final rule, it must prepare a Final Regulatory Flexibility Analysis.

In determining the scope, or “universe,” of the entities to be considered in an IRFA, NMFS generally includes only those entities that are directly regulated by the proposed action. If the effects of the rule fall primarily on a distinct segment, or portion thereof, of the industry (e.g., user group, gear type, geographic area), that segment would be considered the universe for the purpose of this analysis. NMFS interprets the intent of the RFA to address adverse economic impacts, not beneficial impacts, and thus such a focus exists in analyses that are designed to address RFA compliance.

Data on cost structure, affiliation, and operational procedures and strategies in the fishing sectors subject to the proposed regulatory action are insufficient, at present, to permit preparation of a “factual basis” upon which to certify that the alternatives considered do not have the potential to result in “significant economic impacts on a substantial number of small entities” (as those terms are defined under the RFA). Based on all available information, it is not possible to “certify” this outcome, should one of the action alternatives be adopted.

### 6.2 What is Required in an IRFA

Until the North Pacific Fishery Management Council (Council) makes a final decision on a preferred alternative, a definitive assessment of the proposed management alternatives cannot be conducted. In order to allow the agency to make a certification decision, or to satisfy the requirements of an IRFA of the preferred alternative, this section addresses the requirements for an IRFA. Under 5 U.S.C. section 603(b) of the RFA, each IRFA is required to contain:

- A description of the reasons why action by the agency is being considered;
- A succinct statement of the objectives of, and the legal basis for, the proposed rule;
- A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply (including a profile of the industry divided into industry segments, if appropriate);
- A description of the projected reporting, record keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;
- An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap, or conflict with the proposed rule;
- A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the proposed action, consistent with applicable statutes, and that would minimize any significant economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives, such as:
  1. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
  2. The clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;
  3. The use of performance rather than design standards;
  4. An exemption from coverage of the rule, or any part thereof, for such small entities.

In preparing an IRFA, an agency may provide either a quantifiable or numerical description of the effects of a proposed action (and alternatives to the proposed action), or more general descriptive statements, if quantification is not practicable or reliable.

### 6.3 Definition of a Small Entity

The RFA recognizes and defines three kinds of small entities: 1) small businesses, 2) small non-profit organizations, and 3) small government jurisdictions.

Small businesses. Section 601(3) of the RFA defines a “small business” as having the same meaning as “small business concern,” which is defined under Section 3 of the Small Business Act (SBA). “Small business” or “small business concern” includes any firm that is independently owned and operated and not dominant in its field of operation. The SBA has further defined a “small business concern” as one “organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials or labor... . A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the firm is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture.”

The SBA has established size criteria for all major industry sectors in the United States, including fish harvesting and fish processing businesses. Effective July 22<sup>nd</sup>, 2013, a business involved in fin-fish harvesting is a small business if it is independently owned and operated, not dominant in its field of operation (including its affiliates), and if it has combined annual gross receipts not in excess of \$19.0 million for all its affiliated operations worldwide.<sup>10</sup> A seafood processor is a small business if it is

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<sup>10</sup> SBA updated the Gross Annual Receipts thresholds (78 FR 37398, June 20, 2013, effective July 22, 2013) for determining "small entity" status in finfish harvesting under the RFA. This is a periodic action to account for the impact of economic inflation. The revised threshold for "commercial fin-fishing" operations (which, at present, has been determined by NMFS to include catcher/processors, as well as catcher vessels) changed from \$4.0

independently owned and operated, not dominant in its field of operation, and employs 500 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. A business involved in both the harvesting and processing of finfish products is a small business if it meets the \$19.0 million criterion for fish harvesting operations. Finally, a wholesale business servicing the fishing industry is a small business if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

The SBA has established “principles of affiliation” to determine whether a business concern is “independently owned and operated.” In general, business concerns are affiliates of each other when one concern controls or has the power to control the other, or a third party controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships, in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party with such interests aggregated when measuring the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern’s size. However, business concerns owned and controlled by Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development Corporations authorized by 42 U.S.C. 9805 are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership when 1) a person is an affiliate of a concern if the person owns or controls, or has the power to control 50 percent or more of its voting stock, or a block of stock which affords control because it is large compared to other outstanding blocks of stock, or 2) if two or more persons each owns, controls or has the power to control less than 50 percent of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large as compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises where one or more officers, directors, or general partners, controls the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor and subcontractor are treated as joint venturers if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

Small organizations. The RFA defines “small organizations” as any not-for-profit enterprise that is independently owned and operated, and is not dominant in its field.

Small governmental jurisdictions. The RFA defines “small governmental jurisdictions” as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of fewer than 50,000.

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million to \$19.0 million in annual gross receipts, from all its economic activities and affiliated operations, worldwide.

## 6.4 Reason for Considering the Proposed Action

The Council formulated the following problem statement in June 2012, to initiate this analysis.

*Grenadiers are not included in the BSAI or GOA groundfish FMPs. There are no limits on their catch or retention, no reporting requirements, and no official record of their catch. However, grenadiers are taken in relatively large amounts as bycatch, especially in longline fisheries; no other Alaskan groundfish has such high catches that is not included in the FMPs. Considerable information on giant grenadier exists that can be used for stock assessment (under Tier 5). Inclusion in the groundfish FMPs would provide for their precautionary management by, at a minimum, recording their harvest and/or placing limits on their harvest.*

Although grenadiers have not been in the FMPs since 1980, there is no longer a valid scientific reason to exclude them. Bottom trawl surveys have shown giant grenadier is the most abundant species at depths 200 to 1,000 m on the continental slope of the GOA, eastern Bering Sea, and Aleutian Islands. Hence, it is of great ecological importance in this habitat. Based on this ecological importance alone, giant grenadier should be included in the FMPs. This is especially true given the current emphasis on ecosystem management by NMFS and the recommendations in the Magnuson-Stevens Act to implement ecosystem management. Moreover, giant grenadier is taken in relatively large amounts as bycatch, especially in hook-and-line fisheries for sablefish and Greenland turbot. The giant grenadier are nearly all (more than 99 percent) discarded, and discard mortality is 100 percent because none of the fish survive when brought to the surface. If giant grenadier were included in the FMPs, reporting of catches would be mandatory, and this would result in better, more accurate catch estimates than the present estimates that are based exclusively on observer data. Inclusion in the FMPs would also serve to address the problem of giant grenadier bycatch and discard waste in a formalized manner. Grenadiers in Alaska are unique in that this is the only non-FMP species group for which a stock assessment, using Tier 5 calculations, has been prepared. The stock assessment uses giant grenadier a proxy for the species group.

Based on these reasons, grenadier assessment authors, the BSAI and GOA Groundfish Plan Teams, and the SSC have all recommended in recent years that grenadiers should be included in the FMPs, where they would be subject to management purview.

## 6.5 Objectives of Proposed Action and its Legal Basis

### *Objectives*

The objectives of this action are provide in the statement of the purpose and need for the action contained in the Regulatory Impact Review and are as follows.

- To provide formalized structure for grenadier management in the BSAI and GOA EEZs.
- To include grenadiers in the groundfish FMPs for the BSAI and GOA,
- To provide for precautionary management by, at a minimum, recording grenadier harvest and/or placing limits on their harvest.
- To address the problem of grenadier bycatch and discard waste in a formalized manner.

### *Legal Basis*

NMFS manages the U.S. groundfish fisheries of the BSAI and GOA under the BSAI groundfish FMP and the GOA groundfish FMP. The Council prepared the FMPs, and the Secretary of Commerce approved them, under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801, *et seq.*). Regulations implementing the FMPs are contained in 50 CFR part 679. General regulations that also pertain to U.S. fisheries appear at subpart H of 50 CFR part 600.

## **6.6 Number and Description of Directly Regulated Small Entities**

This action would directly regulate the harvest activities of all catcher vessels and catcher/processors conducting directed fishing for groundfish in the BSAI and GOA management areas. The action would not directly regulate shoreside processors, as they do not participate in harvesting of groundfish.

Small business firms, non-profit entities, and small government entities are the appropriate focus of consideration in a regulatory flexibility analysis. Following the practice in other analyses in the Alaska Region, fishing vessels have been used as a proxy for business firms. This is a practical response to the relative lack of information currently available on the potentially complex co- or joint-ownership, and various contractual relationships that are believed to exist among multiple vessels operated by individual firms. This approach can lead to overestimates of the numbers of entities, since several vessels may be owned by a single firm; and to an overestimate of the relative proportion of small entities, since more of the smaller vessels might have been treated as large entities, had multiple ownership and/or affiliation structures been addressed. No large entities would have been moved to the small entity category as a result of the adoption of this approach.

Many of the vessels active in these fisheries operate in formally established fishing cooperatives. These constitute affiliations within the meaning of the RFA. In this analysis, affiliations among entities participating in cooperatives formed pursuant to Secretarial regulation, including the American Fisheries Act, Amendment 80 trawl cooperative, GOA Rockfish cooperative<sup>11</sup>, and BSAI Crab Rationalization cooperatives, as well as the private voluntary cooperative recently formed among the BSAI Freezer-Longliner vessel operators, are expressly taken into account.

Earnings from all fisheries in and off Alaska for 2012 were estimated for trawl catcher/processors and catcher vessels, and non-trawl catcher/processors and catcher vessels that participated in the BSAI and GOA groundfish fisheries. Table 6.1 provides the numbers of BSAI and GOA small entities that would be directly regulated by this action. These small entities had total gross revenue from all fisheries off Alaska of less than \$19 million in 2011 and were not affiliated with any of the aforementioned cooperatives. In the GOA, there were a total of 688 small catcher vessels and 5 small catcher/processors, for a combined total of 693 small GOA entities in 2012. The majority of these (561) are Catcher Vessels in the hook-and-line (HAL) gear type. In the BSAI, there were 76 small catcher vessels and 5 small catcher/processors, for a total of 81 small BSAI entities in 2012. The combined total for all of Alaska is 725 small catcher vessels and 10 small catcher/processors, or 735 small Alaska groundfish vessels in total in 2012.

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<sup>11</sup> The Central GOA Rockfish Pilot Program expired on December 31, 2011. The Council's Amendment 88 to the GOA FMP replaced the Pilot Program with a new Rockfish Program that carried forward key elements of the older Pilot Program, while making changes to fix problems that had been identified. In 2011, NMFS published the Notice of Availability for the FMP amendment and the final rule (76 FR 45217, July 28, 2011; 76 FR 81248, December 27, 2011). The effective date for this action was December 27, 2011. Because of the similarities between the programs, the experience during the Pilot Program in 2011 is used to evaluate the small entity status of vessels that are members of Rockfish Program cooperatives.

Through the CDQ program, the Council and NMFS allocate a portion of the BSAI groundfish TACs, and apportion prohibited species halibut and crab PSC limits, to 65 eligible Western Alaska communities. These communities work through six non-profit CDQ groups, and are required to use the proceeds from the CDQ allocations to start or support activities that will result in ongoing, regionally based, commercial fishery or related businesses. The CDQ groups receive allocations through the specifications process, and are directly regulated by this action, but the 65 communities are not directly regulated. Because they are explicitly defined as small nonprofit entities within the RFA, the CDQ groups are small entities for purposes of this analysis.

**Table 6-1 Number of non-affiliated groundfish vessels that caught or caught and processed less than \$19.0 million ex-vessel value or product value of groundfish and other species by area, vessel type, and gear, 2012**

		Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
		Catcher Vessels	Catcher/Processors	All Vessels	Catcher Vessels	Catcher/Processors	All Vessels	Catcher Vessels	Catcher/Processors	All Vessels
2012	HAL	561	4	565	31	3	34	576	7	583
	POT	119		119	26	3	29	135	3	138
	TRAWL	47	1	48	24		24	59	1	60
	ALL GEAR	688	5	693	76	5	81	725	10	735

NOTE: Includes only vessels that fished part of Federal groundfish TACs.

Source: CFEC Fish Tickets, weekly processing reports, NMFS Permits, Commercial Operators Annual Report, ADF&G intent to operate listing as tabulated in Ttable 37 of the draft 2012 Economic Status of Alaska Grounfish Fisheries. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

## 6.7 Recordkeeping and Reporting Requirements

The IRFA should include “a description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record...”

Implementation of Alternative 1, the no action alternative, would not change the overall reporting structure and record keeping requirements of the vessels and processors participating in the BSAI and GOA groundfish fisheries.

Alternatives 2, 3, and 4, the action alternatives, would change slightly the overall reporting structure and recordkeeping requirements of the vessels and processors participating in the BSAI and GOA groundfish fisheries. Under Option 1 the catch and disposition of a single grenadier species, the giant grenadier, would need to be recorded and reported. Under Option 2 the catch and disposition of three grenadier species; giant grenadier, popeye grenadier, and Pacific grenadier, would need to be recorded and reported.

## **6.8 Federal Rules that may Duplicate, Overlap, or Conflict with Proposed Action**

There are not any Federal rules that duplicate, overlap, or conflict with the Alternative 1, the no action alternative. Under Alternatives 2, 3, and 4, the action alternatives, there do not appear to be any Federal rules that duplicate, overlap, or conflict with the proposed action. Some current Federal regulations will need modification to implement the Council's preferred alternative (when identified).

## **6.9 Impacts of the Action on Small Entities**

The RIR (Section 5) identifies the potential impacts of the proposed actions. That brief analysis shows that Alternatives 3 and 4 would not have adverse socioeconomic impacts. Thus, directly regulated small entities would not be adversely affected by Alternatives 3 or 4.

The analysis in the RIR identifies the potential for reduction in BSAI fishery gross revenue due to the presence of a 2.0 million mt TAC cap in the BSAI. Some reduction in TAC of another species, presumably with present market value, would be necessary to "fund" a grenadier TAC in the BSAI; however only in years when the BSAI 2 million mt groundfish cap is reached. If a market cannot be established with similar value to whichever species the grenadier TAC is taken from, then fishery total revenue can be expected to decrease. The amount of potential decrease is unknown as it would depend on the outcome of the Council's annual TAC setting process. It is simply not possible to determine what the TAC levels will be or where the grenadier TAC may come from. As a result, it is possible that Alternative 2 would adversely affect directly regulated small entities operating in the BSAI; however, it is also possible, given development of a market, that retention of grenadier incidental catch and/or directed fishing for grenadier in time when other groundfish stocks decline could improve optimum yield in the BSAI. These effects will depend on various species abundances, the TAC setting process, as well as the allocations by species and gear type that occur by regulation.

## **6.10 Description of Significant Alternatives to the Proposed Action**

An IRFA should include "A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the Magnuson-Stevens Act and any other applicable statutes and that would minimize any significant (implicitly adverse) economic impact of the proposed rule on small entities."

The Council considered four alternatives for this action. The first is the requisite No Action alternative, under which grenadiers would not be included in either the BSAI groundfish FMP or the GOA groundfish FMP. The action Alternatives 2, 3, and 4 would include grenadiers in the BSAI and GOA groundfish FMPs as either "in the fishery" or as "ecosystem component" species. Based upon the best available scientific data, the aforementioned analyses, as well as consideration of the objectives of the action, it appears that all of the action Alternatives 2, 3, and 4 have the potential to accomplish the stated objectives of the Magnuson-Stevens Act and other applicable statutes, while simultaneously minimizing adverse economic impact on small entities.

## 7 Magnuson-Stevens Act and FMP Considerations

### 7.1 Magnuson-Stevens Act National Standards

Below are the 10 National Standards as contained in the Magnuson-Stevens Fishery and Conservation Act (Magnuson-Stevens Act), and a brief discussion of the consistency of the proposed alternatives with those National Standards, where applicable.

**National Standard 1** — Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery

The action Alternatives 2, 3, and 4 analyzed in this document would include grenadiers in the BSAI and GOA groundfish FMPs as either “in the fishery” or as “ecosystem component” species. Grenadiers are taken incidentally in other directed fisheries, and there are no directed fisheries targeting grenadiers at present. Based on recent stock assessments prepared for grenadiers they are not subject to overfishing, overfished, or approaching an overfished condition. Under each of the action alternatives considered in this analysis, management measures could be adopted to prevent overfishing. Alternative 1 does not comport with NS1 as there would be no management measures to conserve, manage or prevent overfishing of grenadiers. In terms of achieving “optimum yield” from the fishery, the Act defines “optimum,” with respect to yield from the fishery, as the amount of fish which—

- (A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;
- (B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and
- (C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Overall benefits to the Nation may be affected by the proposed action, though our ability to quantify those effects is quite limited. Overall net benefits to the Nation would not be expected to change to an identifiable degree between the alternatives under consideration.

**National Standard 2** — Conservation and management measures shall be based upon the best scientific information available.

Information in this analysis represents the most current, comprehensive set of information available to the Council, recognizing that some information (such as operational costs) is unavailable. Information previously developed on the BSAI and GOA groundfish fisheries, as well as the most recent information available, has been incorporated into this analysis. It represents the best scientific information available. It is worthwhile noting that grenadiers are the only non-FMP species group in Alaska (and perhaps the nation) for which stock assessments, based on Tier 5 calculations, have been prepared.

**National Standard 3** — To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Based on the most recent stock assessments prepared by NMFS for grenadiers, the assessment authors have recommended separate OFLs and ABCs for grenadiers in the BSAI and GOA management areas without further subdivision into smaller geographic areas. The annual TACs under Alternative 2 would be set for grenadiers according to the Council and NMFS harvest specification process. The Council would recommend the TACs for grenadiers based on the most recent stock assessment and survey information, public testimony, and other socioeconomic considerations.

**National Standard 4** — Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various U.S. fishermen, such allocation shall be (A) fair and equitable to all such fishermen, (B) reasonably calculated to promote conservation, and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

Nothing in the alternatives considers residency as a criterion for the Council's decision. Residents of various states, including Alaska and states of the Pacific Northwest, participate in the major sectors affected by these allocations. No discriminations are made among fishermen based on residency or any other criteria.

**National Standard 5** — Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as its sole purpose.

The wording of this standard was changed in the recent Magnuson-Stevens Act authorization, to consider rather than promote efficiency. Efficiency in the context of this change refers to economic efficiency, and the reason for the change, essentially, is to de-emphasize to some degree the importance of economics relative to other considerations (United States Senate, 1996). The analysis presents information relative to these perspectives and provides information on the economic risks associated with the harvest specifications for grenadiers.

**National Standard 6** — Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

All of the action alternatives under consideration in the proposed action appear to be consistent with this standard. Alternative 1, the no action alternative, does not comport with NS6.

**National Standard 7** — Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

All of the alternatives under consideration appear to be consistent with this NS7.

**National Standard 8** — Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

Many of the coastal communities in Alaska and the Pacific Northwest participate in the BSAI and I GOA groundfish fisheries in one way or another such as homeport to participating vessels, the location of processing activities, the location of support businesses, the home of employees in the various sectors, or as the base of ownership or operations of various participating entities. A summary of the level of fishery engagement and dependence in these communities is provided in the RIR.

An analysis of the alternatives suggests that while impacts may be noticeable at the individual operation level for at least a few vessels, the impacts at the community level for any of the involved fishing communities would be well under the level of significance. The sustained participation of these fishing communities is not put at risk by any of the alternatives being considered. Economic impacts to participating communities would not likely be noticeable at the community level, so consideration of

efforts directed at a further minimization of adverse economic impacts to any given community is not relevant.

**National Standard 9** — Conservation and management measures shall, to the extent practicable, (A) minimize bycatch, and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

All of the action alternatives (2, 3, and 4) under consideration in the proposed action appear to be consistent with this standard. Alternative 1, the no action alternative, does not comport with NS9.

**National Standard 10** — Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

The alternatives under consideration appear to be consistent with NS10. None of the alternatives or options proposed would change safety requirements for fishing vessels.

## 7.2 Section 303(a)(9) Fisheries Impact Statement

Section 303(a)(9) of the Magnuson-Stevens Act requires that a fishery impact statement be prepared for each FMP amendment. A fishery impact statement is required to assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures for a) participants in the fisheries and fishing communities affected by the plan amendment; b) participants in the fisheries conducted in adjacent areas under the authority of another Council; and c) the safety of human life at sea, including whether and to what extent such measures may affect the safety of participants in the fishery.

The EA/RIR/IRFA prepared for this plan amendment constitutes the fishery impact statement. The likely effects of the proposed action are analyzed and described throughout the EA/RIR/IRFA. The effects on participants in the fisheries and fishing communities are analyzed in the RIR/IRFA sections of the analysis (Sections 5 and 6). The effects of the proposed action on safety of human life at sea are evaluated above under National Standard 10, in Section 7.1

The proposed action affects the groundfish fisheries in the EEZ off Alaska, which are under the jurisdiction of the North Pacific Fishery Management Council. Impacts on participants in fisheries conducted in adjacent areas under the jurisdiction of other regional fishery management councils are not anticipated as a result of this action.

## 7.3 Groundfish Management Policy Priorities

The alternatives discussed in this action accord with the management policy of in the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and the Fishery Management Plan for Groundfish of the Gulf of Alaska. The Council's management policy includes the following objectives:

- Control the removal of prohibited species through PSC limits or other appropriate measures.
- Continue and improve current incidental catch, prohibited species catch, and bycatch management program.
- Continue to manage incidental catch, prohibited species catch, and bycatch through seasonal distribution of total allowable catch and geographical gear restrictions.

- Continue program to reduce discards by developing management measures that encourage the use of gear and fishing techniques that reduce groundfish bycatch, which includes economic discards.

By proposing to place incidentally caught grenadier species either into the ecosystem component or “in the fishery” as a targeted species in the BSAI and/or GOA groundfish fisheries, this action is consistent with the Council’s longstanding management policy.

## 8 NEPA Summary

One of the purposes of an environmental assessment is to provide the evidence and analysis necessary to decide whether an agency must prepare an environmental impact statement (EIS). The Finding of No Significant Impact (FONSI) is the decision maker's determination that the action will not result in significant impacts to the human environment, and therefore, further analysis in an EIS is not needed. The Council on Environmental Quality regulations at 40 CFR 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." An action must be evaluated at different spatial scales and settings to determine the context of the action. Intensity is evaluated with respect to the nature of impacts and the resources or environmental components affected by the action. NOAA Administrative Order (NAO) 216-6 provides guidance on the National Environmental Policy Act (NEPA) specifically to line agencies within NOAA. It specifies the definition of significance in the fishery management context by listing criteria that should be used to test the significance of fishery management actions (NAO 216-6 §§ 6.01 and 6.02). These factors form the basis of the analysis presented in this Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA). The results of that analysis are summarized here for those criteria.

**Context:** For this action, the setting is the BSAI and GOA groundfish fisheries. Any effects of this action are limited to this area. The effects of this action on society within this area are on individuals directly and indirectly participating in these fisheries and on those who use the ocean resources. Because this action concerns the use of a present and future resource, this action may have impacts on society as a whole or regionally.

**Intensity:** Considerations to determine intensity of the impacts are set forth in 40 CFR 1508.27(b) and in the NAO 216-6, Section 6. Each consideration is addressed below in order as it appears in the NMFS Instruction 30-124-1 dated July 22, 2005, Guidelines for Preparation of a FONSI. The sections of the EA that address the considerations are identified.

**1) *Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?***

(EA Sections 3.5 and 3.10). No. No significant adverse impacts on grenadiers and groundfish target species were identified for the alternatives considered. This is due in large part because at present there is no directed fishery for grenadiers. Grenadiers are taken as incidental catch in other directed groundfish fisheries. No changes in overall amount or timing of harvest of target species are expected under the alternatives being considered, and the general location of harvest is also likely to be similar to the status quo. Therefore, no impacts on the sustainability of any target species are expected.

**2) *Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species?***

(EA Sections 3.6 and 3.10). No. Potential effects of the alternatives considered on non-target and prohibited species are expected to be insignificant and similar to status quo because no overall harvest changes to target species were expected. Because no overall changes in target species harvests under the proposed alternatives are expected, the proposed alternatives are not likely to jeopardize the sustainability of any non-target/prohibited species.

**3) *Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in the fishery management plans (FMPs)?***

(EA Sections 3.9 and 3.10) No. No significant adverse impacts were identified for the alternatives considered on ocean or coastal habitats or EFH. Substantial damage to ocean or coastal habitat or EFH under the alternatives considered is not expected.

**4) *Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?***

(EA Section 3.11) No. Public health and safety will not be affected in any way not evaluated under previous actions or disproportionately as a result of the proposed action alternatives. The alternatives considered would not change fishing methods, timing of fishing, or quota assignments to gear groups, which are based on previously established seasons and allocation formulas in regulations. The inclusion of grenadiers in the BSAI and GOA groundfish FMPs is not expected to have a substantial adverse impact on public health or safety.

**5) *Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?***

(EA Sections 3.7, 3.8, and 3.10) No. The alternatives considered would not change existing protection measures for ESA-listed and candidate species, and their critical habitat, ensuring the action is not likely to result in adverse effects not already considered under previous ESA consultations.

**6) *Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?***

(EA Sections 3.6 through 3.9). No significant adverse impacts on biodiversity or ecosystem function were identified for the alternatives under consideration. No significant effects are expected on biodiversity, the ecosystem, marine mammals, or seabirds.

**7) *Are significant social or economic impacts interrelated with natural or physical environmental effects?***

(EA Section 3, RIR Section 5, and IRFA Section 6). The social and economic impacts of the proposed action alternatives are not expected to be significant as the inclusion of grenadiers in the BSAI and GOA groundfish FMPs does not appear to be excessively expensive to groundfish catcher vessels and catcher/processors. No significant adverse impacts were identified under the alternatives considered for social or economic impacts interrelated with natural or physical environmental effects.

**8) *Are the effects on the quality of the human environment likely to be highly controversial?***

(EA Section 3 and RIR Section 5) No. The action alternatives considered encompass the BSAI and GOA fishery management areas of historical value to the fishing industry. Development of the proposed action alternatives has involved participants from the scientific and fishing communities, and the potential impacts on the human environment are well understood. No issues of controversy were identified in the process.

**9) *Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?***

(EA Section 3.11). No. This action would not affect any categories of areas on shore. This action takes place in the BSAI and GOA fishery management areas. The land adjacent to this marine area may contain archeological sites of native villages. This action would occur in adjacent marine waters so no impacts on these cultural sites are expected. The marine waters where the fisheries occur contain ecologically critical areas. Effects on the unique characteristics of these areas are not anticipated to occur with this action

because the amount of fish removed by vessels is within the total allowable catch (TAC) specified harvest levels, and the alternatives provide protection to EFH and ecologically critical nearshore areas. Shipwreck sites may be located in the action area but these sites are identified on nautical charts and avoided by fishermen to protect their gear. This action would not change this behavior, and therefore, is not expected to result in substantial impacts to shipwreck sites.

***10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?***

(EA Section 3.12) No. The potential effects of the alternatives considered are well understood because of the fish species, harvest methods involved, and area of the activity. For marine mammals and seabirds, enough research has been conducted to know about the animals' abundance, distribution, and feeding behavior to determine that this action is not likely to result in population effects (EA Sections 3.7 and 3.8). The potential impacts of fishing activities on habitat also are well understood as described in the EFH EIS (NMFS 2005) (EA Section 3.9).

***11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?***

(EA Chapter 3.11). No. Beyond the cumulative impact analyses in the Groundfish Harvest Specifications EIS (NMFS 2007), no other additional cumulative impacts were identified.

***12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?***

(EA Section 3.12). No. The alternatives considered have no effect on districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places, nor cause loss or destruction of significant scientific, cultural, or historical resources. Besides shipwrecks, which are addressed under question 9, there are no known cultural, scientific, or historical resources present in the marine waters of the action area.

***13) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?***

(EA Sections 3.11 and 3.12) No. The alternatives considered pose no effect on the introduction or spread of nonindigenous species into the BSAI or GOA beyond those previously identified because they do not change fishing, processing, or shipping practices that may lead to the introduction of nonindigenous species.

***14) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?***

(EA Section 3.11 and 3.12) No. The action alternatives would provide for additional protection for grenadiers in the BSAI and GOA, which is not expected to have a significant effect. The action alternatives considered do not establish a precedent for future action. Pursuant to NEPA, for all future actions, appropriate environmental analysis documents (EA or EIS) will be prepared to inform the decision makers of potential impacts to the human environment and to implement mitigation measures to avoid significant adverse impacts.

***15) Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for the protection of the environment?***

(EA Section 3.11 and 3.12) No. The alternatives considered pose no known violation of Federal, state, or local laws or requirements for the protection of the environment.

***16) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?***

(EA Section 3.112) No. The effect on target and non-target species from the alternatives considered are not significantly adverse as the overall harvest of these species would not be affected. No cumulative effects were identified that added to the direct and indirect effects on target and non-target species would result in significant effects.

## 9 Preparers and Persons Consulted

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